



The newsweekly of enterprise network computing

NetworkWorld

January 17, 2000 Volume 17, Number 3

 LESSONS FROM
IN-SITE
HANDING USERS

Bloomberg goes IP

BY CAROLYN DUFFY MARSHAN

NEW YORK — It sounds like a headline Bloomberg might carry: Network upgrade gets information services firm ready for the dot-com era. But in this story, the company that redesigned its network is financial information powerhouse Bloomberg itself.

Bloomberg recently migrated its private network from dedicated terminals and home-grown black boxes running proprietary network protocols to standard PCs, Unix workstations and off-the-shelf routers running IP.

See Bloomberg, page 92.

"Bloomberg is now, in a loose sense, a portal."

Tom Secunda, head of development, Bloomberg

Cisco eyes smaller nets

BY JIM DUFFY

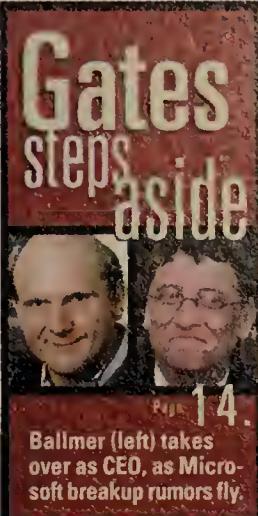
SAN JOSE — Cisco this week will announce three LAN switches designed to bring enterprise-class features and function — at a low cost

— to smaller business networks.

Cisco's Catalyst Mid-Market LAN Switching Solution is a family of stackable and stand-alone Layer 2 and Layer 3. See Cisco, page 88

OTO

America Online CEO Steve Case and Time Warner CEO Gerald Levin's blockbuster deal could alter the 'Net landscape for business customers, not just consumers. Page 6.

The network portal: www.nwfusion.com

Coming to ComNet

Voice-over-IP wares, VPN gear and DSL services on tap.

BY TIM GREENE

If enterprise customers can cut through the clutter and noise of 50,000 attendees at ComNet 2000 next week, they will be treated to myriad new products such as high-quality voice-over-IP gear; faster, less-expensive virtual private network (VPN) devices; and the ingredients for more manageable digital subscriber line (DSL) services.

Start-ups such as Integral Access and VNX — plus veterans such as Alcatel — will be rolling out a slew of hardware, software and services that will

See ComNet, page 90



Plan ahead

Find out what hot stuff you shouldn't miss at next week's ComNet 2000 show in Washington, D.C. Page 51.

Compuware and Concord lead parade of management wares.

BY JEFF CARUSO

In a reversal of recent trends, management software vendors at ComNet 2000 will tie together their various point tools, giving IT managers a simpler way to carry out many management tasks.

Compuware will reveal its strategy for integrating the network modeling software it acquired from CACI International into its own performance monitoring tools. The \$1.9 billion company built its reputation on database and mainframe management software, and the new products

See Management, page 90

Is domain name system vulnerable to slamming?

BY CAROLYN DUFFY MARSHAN

The communications protocol that enables competitive domain-name registration has come under attack by the Internet engineering community for failing to provide adequate precautions against slamming.

Slamming is the unauthorized transfer of customers from one company to another that has plagued the telephone industry.

If domain-name slamming becomes common, companies risk losing ownership of their domain names during registration-oriented transactions, critics charge.

The Registry Registrar Protocol (RRP) lets accredited registrars record .com, .net and .org domain names in a central database operated by Network Solutions, Inc. (NSI) under contract with the U.S. Department of Commerce. NSI wrote RRP, which has been

See Domain, page 16

THE ABCs of PKI

We take the mystery out of setting up a public-key infrastructure.

Page 55.



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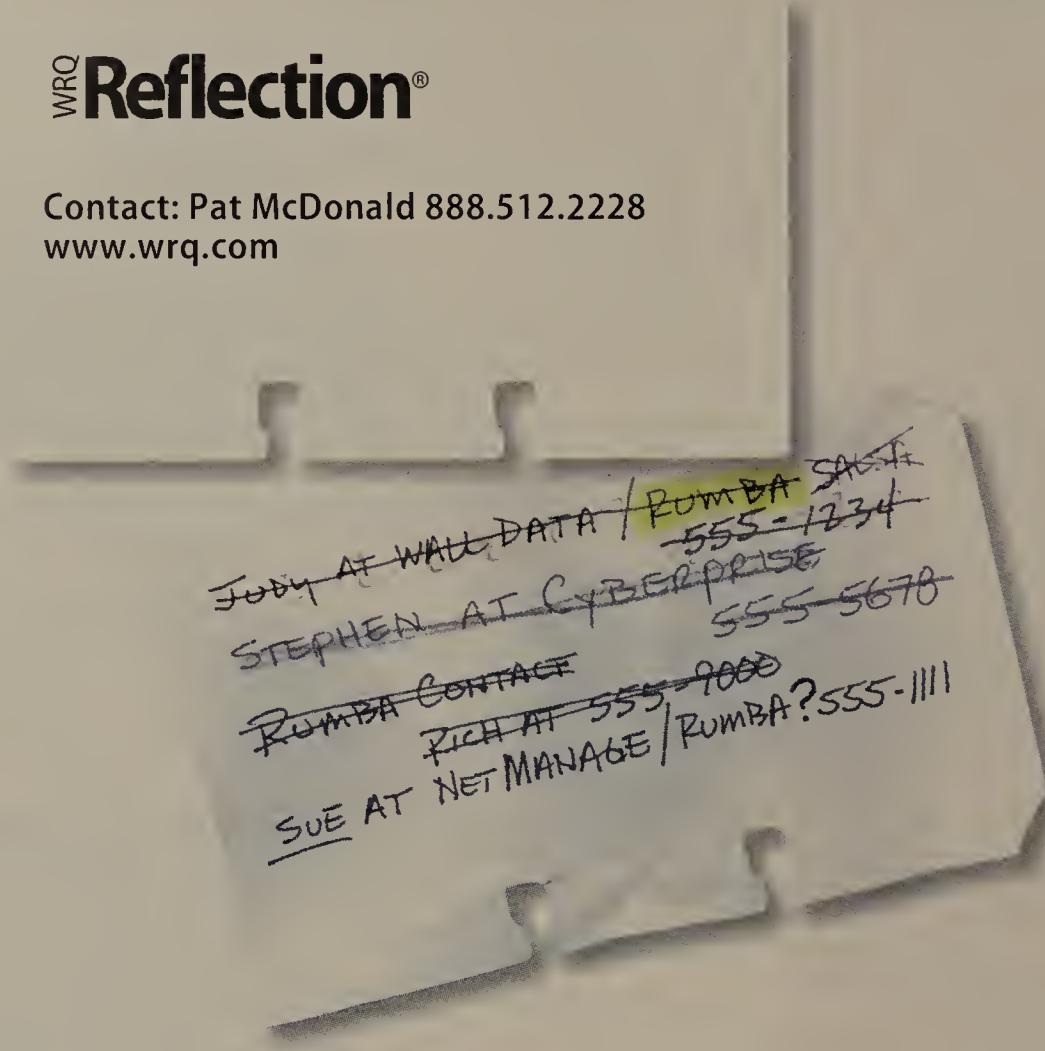


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THIS WEEK
 ONLINE



Keeping Current. Last week, Fred McMillan laid out his list of predictions for the year.

At the top of that list was the breakup of Microsoft. He predicted that the company would be cut into pieces. Now another megacompany is on the horizon. Will AOL/Time Warner face the same scrutiny? **DocFinder: 6439**

Don't mock the computer guy. Reviews Editor Keith Shaw makes his debut in the Water Cooler this week with an ode to your company's "computer guy." Shaw says we should stifle our urge to mock him (even though he often gives us good reason) because we are ruining the profession for the next generation. Seems the government has issued a report saying kids are so unimpressed with the image of the IS professional that they're shying away from careers in math and science. **DocFinder: 6440**

Changing of the guard. So Microsoft CEO Bill Gates has handed over the reins to Steve Ballmer, leaving Gates to focus on product development. Where does that leave the company? Does this foreshadow the government's breakup plan, or was it just time for Bill to skedaddle? Find out more about Ballmer and the thinking behind this change online. **DocFinder: 6441**

You be the panelist. We're getting ready for the LinuxWorld Expo and NetworkWorld

Showdown with some of the top Linux vendors. To guarantee that we ask the right questions, we want you to send us yours. If you had SuSE, Walnut Creek, TurboLinux, VA and Caldera in the same room, what would you ask them? Let us know in our forum. **DocFinder: 6442**

Bandwidth budgets. With Y2K over, it's time for net executives to plan for those long-neglected projects. But as you turn your attention to other matters, columnist Kevin Tolly says: Don't forget about WAN bandwidth. What are you budgeting for? **DocFinder: 6443**

FEATURES

CAN ETHERNET SPAN LAN, MAN AND WAN?
 There's an effort underway to extend Ethernet out onto the WAN. Will it be successful? **Page 59.**

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NEWS BRIEFS, JANUARY 17, 2000

Encryption shackles removed

The U.S. Department of Commerce last week issued revised guidelines on the export of software and hardware products with encryption, making it fairly easy to ship products out of the U.S. except if the recipients are foreign governments. Foreign governments would still be required to get special permits to use U.S.-made encryption equipment, but U.S. corporations wanting to use strong encryption at their business locations around the globe were finally freed from years of red tape. According to Cylink President and CEO Bill Crowell, who chaired the government-appointed advisory group called the President's Export Council Subcommittee on Encryption, the new export rules require a one-time review of products with encryption by the Commerce Department. Only seven countries will still be considered off-limits for U.S. encryption exports, including Libya and Iraq.

The industry group Americans for Computer Privacy applauded the changes but added: "We'll be carefully watching the implementation process to make sure the new regulations do in fact allow American companies to export easily and compete fairly." The American Civil Liberties Union, the Electronic Frontier Foundation and the Electronic Privacy Information Center issued a joint statement lamenting that encryption regulations continue to exist.



Compaq, Microsoft back ASPs

Digex, Compaq and Microsoft last week announced a joint effort to build robust server hosting offerings for application service providers (ASP). Compaq and Microsoft are each investing \$50 million in Digex, in exchange for Digex stock, to fund the development and deployment of services. Digex is expected to deploy Compaq ProLiant and StorageWorks servers running Microsoft's Windows DNA platform, which includes Windows 2000 and SQL Server software. Digex is expected to offer its new ASP hosting services by the end of the second quarter.

Windows 2000 tools debut

With Windows 2000 in the starting blocks, Microsoft and others are starting to think about integration. Last week, Microsoft unveiled its File Migration Utility, a tool for moving data between Novell

NetWare and Win 2000. The tool will be part of Services for NetWare 5.0, due out in April. Microsoft also released a beta of Services for Unix 2.0, a Unix-to-Windows integration package. The software, however, is still missing technology to run Unix and Linux programs natively on Windows.

Ebbers: Forget about free

MCI WorldCom CEO Bernard Ebbers says users may soon enjoy fixed-price "buckets" of telephone service rather than per-minute tolls, but he thinks users should forget about the prospect of free long-distance. In a speech made last week in Washington, D.C., Ebbers said the MCI WorldCom/Sprint merger — which he is trying to get regulators to approve — will not rob users of a major service option and thus run the risk of higher prices. That's because the amount of network capacity is growing too rapidly for any carrier to control prices. But "free long-distance? Never," Ebbers said in response to a question from the audience. Any such offers that users might think they see is "going to be a marketing scheme," he said. All carriers have costs they have to pass along and carriers build those costs into their pricing, he said, making no exception for IP telephony carriers.

Ebbers also announced that MCI WorldCom is adopting an "open access" policy on its networks, and he specifically said a combined MCI WorldCom/Sprint company would offer its large amount of fixed-wireless spectrum to competitors. Asked whether MCI WorldCom might next seek an international merger in 2001, the famously acquisitive telecom chieftain quipped that he might even propose such a merger later this year.

Survey: E-commerce woes global

Nondelivery of ordered goods and difficulty obtaining refunds is a global problem in the online shopping world, according to an analysis released by The European Commission. The report contains research on e-commerce across Europe, the U.S., Japan, Australia and Hong Kong. Researchers from 11 countries were given a list of eight products to shop for over the Internet, buying them both locally and from one other site abroad. Based on 151 orders at sites in 17 countries, the researchers found significant confusion regarding the geographic location and identity of the e-business, a lack of information about delivery charges when buying abroad, and, in only 22% of the cases was it clear that the product was in stock.

AOL/Time Warner offers glimpse of 'Net's future

BY NETWORK WORLD STAFF

Imagine having a movie-quality training video beamed to your desktop so you can finish your network certification during your lunch hour. Or clicking on your corporate Web site and having a two-way conversation with a virtual benefits administrator. Or downloading your company's CEO's latest speech so you can paste a sound bite into a customer presentation.

Sound far-fetched? Not if Steve Case's vision of the Internet comes to pass.

In his bid to merge with media giant Time Warner, America Online's chairman promises to revolutionize the Internet by pumping rich, multimedia content over high-speed networks to customers across America.

"By joining forces with Time Warner, we will fundamentally change the way people get information, communicate with others, buy products and are entertained," Case vows.

Last week AOL, the world's biggest ISP, with 20 million subscribers, and Time Warner, the world's biggest media company, with extensive holdings in magazines, music and video production, agreed to join forces in what has been hailed as the biggest merger ever.

Worth an estimated \$160 billion, the deal will create a technology powerhouse with assets ranging from AOL's massive dial-up network to Web browser software from Netscape Communications to Time Warner's vast cable television network and its Road Runner two-way cable modem access service.

While the deal was driven by

See AOL, page 14

Media giant match-up

America Online's purchase of Time Warner would create the country's largest media company with far-reaching Internet, telecommunications and entertainment offerings.

\$134.3 Market capitalization (in billions)

\$95.6

AOL CEO Steve Case and Time Warner CEO Gerald Levin discuss the merger last Monday at a press conference in New York.

AOL

1999 revenue (Q1-Q3): \$3.9 billion

Employees: 12,100

Worldwide members: 20 million

Assets:

- Netscape software products and Web portal.
- AOL Instant Messenger software.
- Compuserver online service.
- DigitalCity.com Web site.

Time Warner

1999 revenue (Q1-Q3): \$13.4 billion

Employees: 68,799

U.S. Cable TV subscribers: 11 million

Assets:

- No. 1 U.S. Cable TV provider.
- Operates CLEC business in 11 states.
- Cable TV stations, publishing and movie studios.



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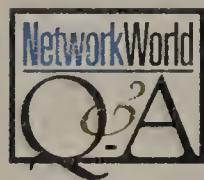
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EMPOWERING THE
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New Lotus chief plays up IBM experience

Twenty-three year Big Blue veteran Al Zollar doesn't anticipate any culture clash.



IBM two weeks ago tapped Al Zollar to run its

Lotus subsidiary after Jeff Papow's resigned as CEO. Zollar, who officially takes over on Feb. 1, has been with IBM for 23 years, spending the first 10 as a field systems engineer responsible for helping customers implement networks, and the past 13 years in a variety of management roles. Zollar spoke last week with Network World writers John Fontana and Marc Songini about the challenges of leading Lotus, which is locked in a battle with Microsoft for supremacy in the messaging/collaboration software market while also trying to establish itself as a leader in knowledge-management technology.

As a longtime IBMer, what do you bring to a subsidiary as seemingly independent as Lotus?

I've had a lot of different experiences at IBM, but two of them have really helped me understand what it is like to be in a smaller company. I was the senior-most IBM guy attached to Tivoli, and I had responsibilities for integrating the IBM people into Tivoli. Most recently, the Dascom acquisition that we completed under the Network Computing Software Division gave me the chance to work very carefully with the people of Dascom so they felt good about the way we integrated them into IBM. So I have an understanding of some of the cultural issues that can exist when you are in this situation.

Third-party developers embracing Domino R5.
Page 39.



How do you best address customer fears that the culture of Lotus will go away with the arrival of an IBM veteran?

It is funny, a lot of people are looking at this as "Here is a longtime IBMer vs. a longtime Lotus person or someone else from the industry." You should look at this from the perspective of this being an inside person vs. an outside person. With the experience that I have had inside IBM, and working with Lotus, Tivoli and other people, I

can help the team attack the markets that we want to succeed in so customers will get the best of IBM.

How would you describe your management style?

I try to come in, listen to people and let them know I want to be an enabler and someone who can help the entire team succeed. I hope that my ears get real big and my mouth shrinks a little bit, so I can really lead the team effectively.

What are the three most important technologies or programs underway at Lotus, and will they change in the foreseeable future?

Technically, I'm not on the job until Feb. 1, so I would not want to presume that I know a lot about all the things that are going on here. But it is very clear to me that organizations of all types are striving to become perpetual learning organiza-

tions, and the base of that is messaging and collaboration.

Lotus has had trouble delivering major software products on time, most notably Notes/ Domino R5. How will you address that situation?

I am in a learning mode. But if you look at any big software projects, you see similar results. □

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IBM throws Linux lovefest

BY MARC SONGINI

IBM said last week it would be pushing harder than ever to promote upstart operating system Linux.

To that end, the company will build a Linux development group that will make existing IBM technology available to Linux customers and developers. Without going into specifics, Irving Wladawsky-Berger, the newly appointed vice president of technology and strategy at IBM's Enterprise Server Group, says Linux will get a boost in clustering, scalability and manageability, all courtesy of IBM's software stable.

IBM will work with the Linux community to "build a more robust version of Linux by open-sourcing select IBM technologies and integrating them into Linux," Wladawsky-Berger says.

In the same announcement, IBM also said it will be phasing out its 4-year-old Internet

Division, which Wladawsky-Berger headed. The Internet Division has successfully fulfilled its mission to develop products and presence for the Web throughout IBM, Wladawsky-Berger says.

"Linux will be integral on all IBM platforms, even the S/390," says Frank Dzubeck, president of Communications Network Architects, a consultancy in Washington, D.C. This will probably force IBM competitors such as Compaq, Dell and Hewlett-Packard to beef up their support for Linux. "This is an evolutionary trend," he says.

Some observers believe Big Blue is already the leading proponent of Linux, delivering the most comprehensive service and support. For example, IBM offers services and consultation for Linux users, and has made a fair portion of its middleware and all its server platforms Linux-friendly. For instance, IBM's Netfinity PC server unit is

actively promoting Linux as a less-expensive alternative to Windows NT.

The RS/6000 division has also made some of its models, such as the F50, capable of running a Linux operating system. Later this year, IBM will provide a free software tool kit that will let developers run Linux applications on the AIX 4.3.3 platform. The company has promised that Linux applications will be able to run on the upcoming Intel-chip-based Unix flavor, Monterey. IBM is also letting some of its S/390 users test a partitioned version of Linux tweaked to run on a mainframe and is waiting on results.

Indeed, while Compaq, Dell and HP also offer Linux on their servers, they are doing so with less fervor than IBM, says Stacey Quandt, an analyst at Giga Information Group, a consultancy in Cambridge, Mass.

Sun may also start considering bundling Linux on its low-end and midrange servers. Eventually, depending on the operating system's success, vendors may consider consolidating all their applications on Linux, Quandt says. □

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Novell offers multiple-level security authentication

BY DENI CONNOR

SAN JOSE — Users wanting to consolidate security services or increase network security may want to take a look at software Novell will introduce this week.

Novell Modular Authentication Service (NMAS) lets IT professionals establish multiple levels of security that go

RSA Conference 2000

beyond password authentication. NMAS, which will be introduced at the RSA Security conference, allows digital certificates, tokens, smart cards and biometric devices — such as fingerprint or retinal scans — to be authenticated to Novell Directory Services (NDS) before granting access to sensitive data on a network.

Novell today uses a two-process authentication method in which users seeking access to the network enter passwords that are encrypted by an RSA security algorithm.

A second process allows authentication to an NDS server. NMAS extends password authentication from a "what you know" scheme to a "what you have" (smart card) or "what you are" (fingerprint or retinal scan) technology.

With NMAS, Novell is one of the first vendors to allow multiple levels of authentication to be combined to afford network access.

For instance, to access supersensitive data, a user may need to enter a password and use a SecurID-generated token. In contrast, Windows 2000 will only allow single-level authentication through passwords, smart cards or biometric devices, according to Microsoft.

Jim Hurley, an analyst with Aberdeen Group in Boston, says users don't want to increase their security alternatives but want to have the flexibility to employ a variety of security mechanisms. Many companies have already installed biometric devices and smart cards for physical access that are separate from the network infrastructure for remote user access.

"User desire for multiple levels of authentication has

been unabated for two years," Hurley says.

Mike Zeiman, IT analyst for Dow Chemical Employees'

Credit Union in Midland, Mich., is investigating the use of strong authentication in NDS for his employees and

banking customers.

"I continue to see authentication solutions, but they aren't tied to NDS," Zeiman says. "I have applications that are sensitive running on my NetWare and Unix servers. Theoretically, through NMAS and NDS, I could authenticate in various ways to either network."

NMAS configuration is performed via the NDS management utility, ConsoleOne. NMAS will work with token devices from RSA Security, ActiveCard and Vasco Data Security, and biometric devices from Indentix and Saflink, among others.

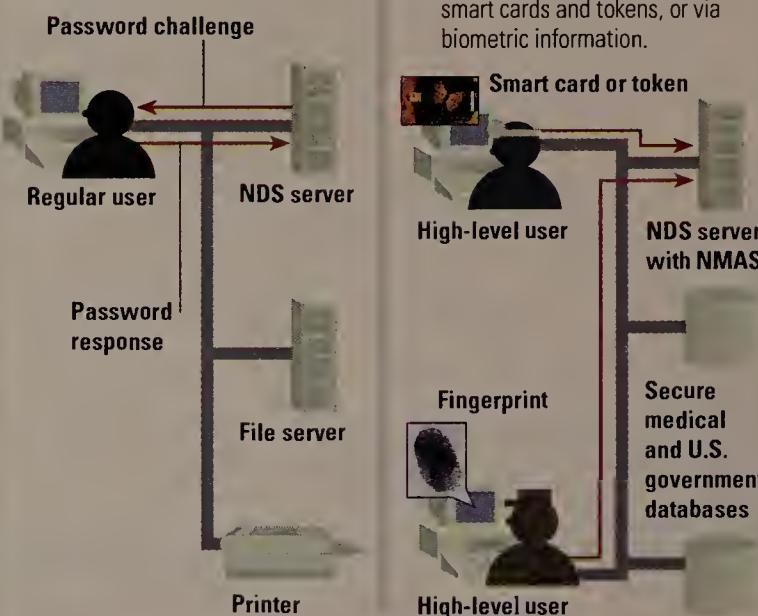
An NMAS starter pack that allows only a single-method logon will be bundled free with numerous Novell products, including NetWare 5.1.

A separate Corporate Edition, which allows multiple-method logon, will be available this quarter. Novell declined to specify pricing.

Novell: www.novell.com/products/nmas

Novell takes security two steps further

- ① Traditional NDS user authentication is based on password challenge and response for access to standard network resources.
- ② Network environments with highly sensitive data stores, such as those in the U.S. Department of Defense and hospitals, can use NMAS to require users to authenticate with smart cards and tokens, or via biometric information.



Security vendors plan product blitz at RSA conference

BY ELLEN MESSMER

SAN JOSE — The RSA Security conference this week will be a launch pad for new products, including cryptographic processors, firewalls, intrusion-detection software and public-key infrastructure (PKI) tool kits.

IBM will announce the shipment next quarter of the IBM 4758 Model 2 and 23 Cryptographic Coprocessors, which are programmable cards that handle Windows NT or OS/2 hardware-based encryption. Faster and more secure than encryption software, the IBM hardware can process Secure Sockets Layer (SSL), Triple-Data Encryption Standard, ID number generation.

NetGuard will be displaying Guardian Pro for NT, a firewall for securing enterprise networks that may use cable modems and asymmetric digital subscriber line to reach the Internet. In addition, the company will introduce a \$199 fire-

wall called Guardian Soho NT for offices with up to 10 users.

Intrusion-detection software vendor Tripwire will show an early release of a product called Tripwire Enterprise Control, which includes agent software for detecting unauthorized file changes in up to 250 NT or Unix server nodes.

"Our earlier version of Tripwire had no central console for reporting on or configuring multiple nodes," says Gene Kim, chief technology officer at the company. "The central console, based on NT, has a 'red light, green light' feature, so you don't have to read 50 reports to know files haven't been tampered with." Tripwire expects to ship the product in March at a price of \$12,995 for the console and \$495 for each server agent.

On the show floor, Cylink will be demonstrating two new products, a digital certificate tool kit called NetAuthority, and an IP Security gateway, NetHawk, which is a hardware

appliance with an embedded operating system. Pricing is not yet available.

Conference host RSA Security will also make news. The company, which makes the SecurID authentication tokens and server for one-time passwords, will announce SecurID agent software that can sit on Windows 2000 to hand off authentication requests to its ACE/Server in order to provide strong authentication of Win 2000 applications. RSA will have a similar agent for Novell Directory Services and Lotus' Domino 5.0 server.

RSA will also announce two tool kits for including SSL encryption in wireless devices. The first, the BSAFE SSL Toolkit for Low-Bandwidth Devices, will let developers include native SSL and X.509 certificates in wireless handheld units of any type.

The second, called BSAFE Wireless Transport Layer Security (WTLS) 1.0, supports the encryption security proto-

col outlined in the wireless industry's standard for browser-based wireless communication, the Wireless Application Protocol (WAP).

Wireless of all sorts is getting the attention of PKI vendors. Entrust, a competitor to RSA, will show how its PKI tool kit, which is not WAP-based, can be used to secure and sign traffic between wireless text pagers used in business-to-business communication.

Entrust will also be part of a Microsoft announcement stating that the Entrust PKI 5.0 tool kit and certificates work with Win 2000. In addition, Intel will announce it is bundling Entrust software into its network interface cards to provide secure Ethernet access. At its booth, Hewlett-Packard will be showcasing DomainGuard Enterprise 1.0, a module for the Microsoft Internet Information Server to place access controls on Web server pages. The HP product starts at \$2,994 for 100 users. □



This week's question:

What organization just named David Farber, University of Pennsylvania telecommunications professor and Internet pioneer, as its chief technologist?



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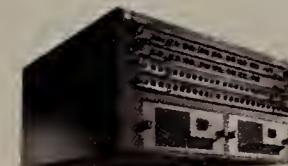
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Firms work on standard to provision optical nets

BY TIM GREENE

When it comes to provisioning high-speed connections in switched optical networks, vendors need a standard way for their gear to cooperate.

A new consortium made up of some 50 vendors, including Williams Communications and Siemens, is hoping to do just that (see graphic). Specifically, the Optical Domain Service Interconnect (OSDI) consortium has set a goal of writing a protocol by year-end that will let equipment made by one vendor provision

bandwidth in the networks of optical switches made by other vendors.

The group will define an OSDI protocol that will give routers and switches the ability to set up light circuits across optical backbones. Optical nets use light to transfer data. As these edge devices recognize traffic patterns and the requirement for more bandwidth through the optical core, they will be able to set up new connections.

The protocol could also be used to give carrier customers the ability to provision extra bandwidth within

seconds to meet their needs. Without such a protocol, setting up optical light paths would have to be done by hand by a network manager overseeing the optical switches — a more time-consuming process.

"If carriers want to keep customers, they can't make them wait 60 days to turn up a new T-1," says Sean Welch, vice president of marketing and sales for Tenor Networks, a member of the vendor group.

OSDI is being pushed by Sycamore Networks, which makes core optical switches.

The standard will allow dynamic and automatic provisioning of light streams across a core network of Sycamore switches, says Jeff Kiel, vice president of product marketing for Sycamore.

Such provisioning will allow customers to buy high bandwidth for short-term use, such as a high-definition video transmission that a television network might need. The provisioning will also make it possible for routers and switches to automatically book more bandwidth when they see bursts in demand.

The OSDI group plans to submit its standard proposal to formal standards bodies by year-end. The goal is to have

Group pushes for flexible use of optical networks

The OSDI consortium will propose a standard protocol for provisioning bandwidth across switched optical networks. The group includes:

- Sycamore Networks
- Enron Communications
- Redback Networks
- Williams Communications
- Siemens
- Syndesis
- Tenor
- Appian

equipment in production networks using the protocol by the end of 2001, Kiel says. □

3Com unveils telephony roadmap

Plans to scale NBX packet and PBX features to support more users.

BY JIM DUFFY

SANTA CLARA, CALIF. — 3Com wants to scale its LAN telephony platform to support larger enterprises and extend voice capabilities across its portfolio of data network products.

The firm's voice plans, announced last week, center on 3Com's NBX network PBX, which is currently a stand-alone device targeted at small and midsize enterprises, typically with less than 1,000 employees. 3Com says it will extend NBX technology and applications to its workgroup and core network switches to support thousands of users in multiple locations.

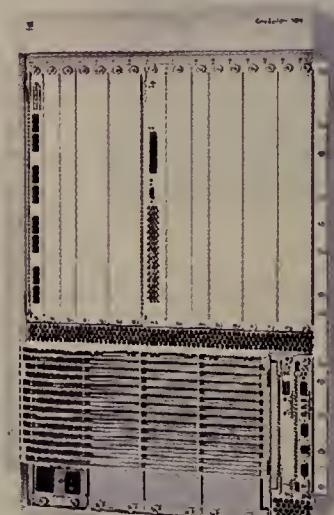
NBX capabilities will be added to 3Com's SuperStack II switches in the second half of 2000 and to the company's CoreBuilder 9000 data center switches in early 2001.

On the WAN side, 3Com's PathBuilder WAN switches will support voice over xDSL in the second half of 2000. PathBuilder switches currently support voice over ATM, voice over frame relay and voice over IP for enterprises looking to replace traditional voice-only trunking with converged voice/data networks.

3Com also plans to add

voice gateway capabilities to the NBX and SuperStack II products based on the H.323 and Session Initiation Protocol standards. These enhancements are slated for late 2000.

In early 2001, 3Com will



3Com plans to add voice capabilities to its CoreBuilder 9000 data center switch.

add these gateway capabilities to the CoreBuilder 9000.

For converged voice/data applications, 3Com plans to release a customer relationship management, multilocation call center processing and mixed media service (voice/fax, voice/video) application in mid-2000. 3Com also plans to deliver an application developer program in the first half of 2000 to bring additional

third-party applications to the 3Com voice portfolio.

In the second half of this year, 3Com plans to deliver telephony applications that let customers interact with personal digital assistants — such as the company's Palm handheld device — with infrared-enabled telephones. This ability will let mobile users personalize and manage telephony communications.

"I like the new strategy," says NBX user Rod White, vice president of telecommunications at the Home Shopping Network in St. Petersburg, Fla. "I believe that they have successfully delivered on the small and medium LAN. We installed one of the 3Com/NBX systems in our facility in Roanoke, Va. The purchase cost was 60% of an equivalent PBX. I also believe that they have delivered on the WAN category, since I can easily connect two NBXs at two locations over the WAN."

But some analysts were less than impressed. Tere Bracco, principal analyst at Current Analysis in Sterling, Va., says 3Com's timeline for scaling NBX puts the company far behind Cisco, Lucent and Nortel Networks in terms of delivering comparable capabilities.

3Com: www.3com.com

Lucent polishes its VPN offerings

BY DENISE PAPPALARDO

BASKING RIDGE, N.J. — Lucent is attempting to bridge gaps between its multiple virtual private network (VPN) product lines by promising business users ease of management and strong security.

This week Lucent is expected to announce its Secure VPN product line that includes its VPN Gateways, VPN Routers, secure client software and centralized policy management systems. Lucent is integrating its VPN Gateways with VPN devices acquired through

Lucent's VPN quilt

Lucent is weaving its various VPN product lines into one interoperable system. Lucent's Security Management Server and its QVPN Builder (formerly from Xedia) will be combined with:

- Lucent's VPN Routers ...
- AccessPoint (formerly Xedia)
- SuperPipes (formerly Ascend)
- PipeLine (formerly Ascend)
- ... and VPN Gateways:
- VPN Gateway 80
- VPN Gateway 201

Lucent's purchase of Ascend Communications and Xedia last year.

Lucent is achieving this tighter integration by coupling management systems and offering a single secure client that interoperates with all of its VPN hardware devices.

By midyear, Lucent expects to combine its Lucent Security Management Server system and its QVPN policy management system (formerly from Xedia) into a single product. This will allow business users to set policies for their entire VPN and replicate those commands on every VPN Router or VPN Gateway on their network.

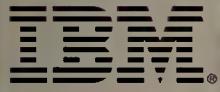
"If they can pull this off, they will own the VPN market," says Eric Hindin, director of data communications at The Yankee Group, a consulting firm in Boston. Today, most policy changes have to be made on individual devices using arcane commands. No other VPN vendor is offering end-to-end policy management support today, he says.

Lucent is also developing a single IPSec client that business users can deploy on remote workers' laptops regardless of which Lucent VPN device they are accessing. Previously, the IPSec clients were specific to

See **Lucent**, page 88



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Gates steps aside as Microsoft airs new vision

BY JOHN FONTANA

REDMOND, WASH. — Microsoft last week began what could be the most dramatic metamorphosis of its 25-year history, and it will happen without Bill Gates at the helm.

In a surprising move last week, Gates, who has been the company's only CEO, handed the title to Steve Ballmer, who has served as president since July 1998. Gates will remain chairman and become chief software architect. The new role, he said, will allow him to return to "what I love most — focusing on technologies for the future."

It also appears to be a strategic move to blunt talk of breaking up Microsoft as a penalty in its antitrust case with the federal government and somewhat removes Gates as the antagonist in the case.

Key is a dramatic transition at Microsoft that Ballmer laid out during a hastily called press conference that raised speculation Microsoft might be making an acquisition in the same vein as America Online's proposed

\$160 billion purchase of Time Warner.

Ballmer's plan requires an overhaul of the company's technology, licensing model and channel partnerships. Microsoft plans to shift from its traditional packaged software focus to developing software as services, such as platforms, applications and program logic that can be shared or rented over the Internet. The last major change was in 1995, when Gates announced Microsoft was finally catching the Internet wave.

The new transition is based on a concept Ballmer called Next Generation Windows Services (NGWS), an Internet-based platform intended to position Microsoft for a future where users will be connected to the Internet by any number of devices.

"The most immediate pieces that move us in this direction are Windows 2000, and updates to our SQL Server product, Exchange product and our development platform," Gates said. All those pieces of Microsoft software make up

Windows DNA 2000, a platform for Web-based application development, which Microsoft has been shopping to service providers.

Ballmer said it will take up to three years to develop NGWS. Microsoft will offer details this spring and deliver some base technologies this summer.

As part of his new duties, Ballmer said he will lead the company through the last chapter of its antitrust battle with the federal government.

See **Microsoft**, page 92



Handoff

After serving as Microsoft's chief executive for more than two decades, Bill Gates will remain chairman and become chief software architect while Steve Ballmer takes over as CEO.

tent are not going to hold much value," Dooley says. "We will see content companies seeking out distribution outlets."

These deals between content providers and ISPs will foster new types of dynamic, interactive content as well as a greater volume of content, which in turn will increase the requirement for network bandwidth.

AOL/Time Warner is "the first Internet-centric media company," says Harris Miller, president of the Information Technology Association of America in Arlington, Va. "These companies have a shared interest in driving bandwidth. . . . I see this deal as the beginning of a push toward making the pipes bigger to deliver rich, Internet content to homes and businesses."

One of the big drivers for this deal was AOL's need to offer multiple broadband service options to its customers. In particular, AOL needed access to Time Warner's extensive cable television lines and the cable modem service offered by Road Runner. AOL had already arranged for wireless satellite access services through Hughes and digital subscriber line (DSL) services through deals with local exchange carriers and UUNET.

AOL's long-term deal with UUNET is one reason why MCI WorldCom is so pleased. MCI WorldCom CEO Bernard Ebbers, speaking at the National Press Club in Washington, D.C., gave a big and unequivocal endorsement to the deal. "I think the AOL/Time Warner merger is a great merger," he said. Of course, MCI WorldCom

— which is trying to convince regulators to approve its pairing with Sprint — has been bullish on every merger and new venture lately.

Fred Baker, chair of the Internet Engineering Task Force, says what's interesting about the AOL/Time Warner deal is the challenge it could pose to competing DSL suppliers as well as to cable access providers such as Excite@home. "Cable has been the Achilles heel to AOL," he says, adding that now AOL will be able to put out a lot of content and have a high-speed network to run it over.

The AOL/Time Warner deal is good news for the entire broadband industry, says Laurie Falconer, a consultant with TeleChoice in Boston, Mass.

"What needs to happen for this deal to have a huge impact on everyone is for AOL to full-force market broadband Internet services to their customers," she says. "This deal brings broadband to the masses."

Falconer adds that AOL/Time Warner now has the opportunity to go after the corporate telecommuting market, too. "Large corporations want to go to one provider with a national footprint," she says.

Carolyn Duffy Marsan, Denise Pappalardo, David Robde and Sandra Gittlen contributed to this report.

More breaking news

Network World Fusion now has more news than ever. Check out these stories online:

IDC: Microsoft breakup would benefit the industry

IDC has issued a 10-page report arguing that turning one Microsoft into three mini-Microsofts would be great for users, investors and Microsoft itself. IDC advocates an operating system, an applications and a database company. The application and database outfits could develop for other platforms and, thus, radically expand those businesses. **DocFinder: 6444**

First Windows 2000 virus detected

As if Microsoft doesn't have enough to think about, along come reports of the very first Windows 2000-specific virus. You've got to hand it to these virus writers. They don't even wait for the software to officially ship before they start to trash it. **DocFinder: 6445**

Teens steal thousands of 'Net accounts

Speaking of those that do evil to computers, a group of young break-in artists stole thousands of Internet accounts and used them to break in to systems around the world — including two nuclear weapons labs! Proud as can be over their success, these junior morons bragged about what they did in Internet chat rooms. Who is usually in these chat rooms? Cops, that's who. Needless to say, the self-proclaimed "crackers" were quickly found out. **DocFinder: 6446**

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Nextlink and Concentric Network to join forces

BY DENISE PAPPALARDO

MCLEAN, VA. — Looking to offer its small and midsize business customers more than just voice services, Nextlink Communications last week announced that it is buying Concentric Network for \$2.9 billion.

Nextlink expects that Concentric's existing virtual private network (VPN), digital subscriber line (DSL) and Web hosting services will be a natural fit for Nextlink's new and existing customers.

Until recently, Nextlink has primarily been a voice carrier, but over the past 12 to 24 months has invested nearly \$2 billion building an

arsenal of network assets from a long-haul fiber backbone to fixed wireless service licenses. The goal: to offer business users competitive local and long-distance voice and data services.

Concentric is a nationwide ISP that supports more than 100,000 customers. The ISP has five data centers, 19 points of presence around the country and DSL service available in 19 cities.

Through a deal with Level 3 Communications, Nextlink has been building a 16,000-route-fiber-mile nationwide network and is offering local voice services in 40 markets, but the company has been lacking any firm data services.

And instead of developing the services in-house, Nextlink decided to buy the services and network from Concentric.

"Concentric is an Internet service leader in terms of Web hosting. It is a huge company in terms of high-speed DSL access and VPN services," says Dan Akerson, CEO and chairman of Nextlink.

Concentric also has strategic partnerships that make the ISP a good partner for Nextlink.

For example, Concentric has a multiyear deal with Corio, the Redwood City, Calif., application service provider, and with SBC Communications. Concentric hosts the majority of Corio's

application and database servers, and provides SBC with access to customers outside the local exchange carrier's traditional service areas.

Concentric is also in the process of acquiring Internet Technology Group, an ISP based in the U.K. that will offer Nextlink access to a new international customer base. Concentric's acquisition of ITG should not affect Nextlink's acquisition of Concentric.

Nextlink also announced last week that it completed its broadband wireless local multipoint distribution services trial in Los Angeles and Dallas, and is planning a 25-city LMDS rollout by year-end.

Customers in Dallas are

accessing the Internet over their LMDS links.

"The service runs like a charm," says Mike Hennefer, president at Corporate USA, a commercial real estate company in Dallas.

During the trial, Hennefer also switched all the company's local voice services over to Nextlink because it was pleased with Nextlink's customer service and quality on its wireless connection, he says. □

ISP Services

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Domain,
continued from page 1

used to support domain name registrations since June, and insists that the protocol offers appropriate protections against slamming.

NSI has asked the Internet Engineering Task Force to publish RRP as an informational document. Recently, however, IETF members have circulated dozens of e-mail messages criticizing the design of the protocol as well as the process by which it was created.

"The protocol submitted by NSI for informal publication by the IETF is too flawed to be considered," says IETF member Ed Gerck, a security specialist who last year served on a panel that advised NSI on the design of a shared registration system protocol. "No one in the IETF [mailing] list supported the protocol as it is."

Patrik Faltstrom, co-director

of the IETF's Applications Area and another member of NSI's advisory panel, says the protocol's design and security shortcomings are the result of having a single organization develop it in a short time frame. "I don't think the business

bed, which ran from April until November of last year.

NSI disagrees with the criticisms leveled against RRP.

"The shared registration system includes multiple levels of security that provide a combination of privacy and authenti-

Domain name knowledge

What you may not know about the Internet domain name system.

- Accredited domain name registrars: **98**
- Domain name registries: **1 (Network Solutions)**
- Domain names registered by Network Solutions: **6.5 million**
- Cost of registering a name: **\$10 to \$35 per year**

requirements [for competitive registration] were available when the protocol started to be designed, so some things, like the transfer of one domain from one registrar to another, were not nailed down properly before someone had to implement it," he says.

RRP handles communications between registrars, which sell registration services to companies and individuals, and the central registry, which serves as the authoritative repository of information about reserved domain names. The protocol does not support communications between registrars and end users who purchase domain names. Based on the Transmission Control Protocol, RRP was deployed in the Commerce Department's Shared Registry System test

cation services for interaction with licensed and accredited registrars," says Scott Hollenbeck, an NSI engineer who helped draft the protocol. "All of the security layers would have to be breached before an intruder could gain access to private registry systems.

"Slamming is prevented by providing notification of all requested transfers to the current sponsoring registrar," he adds. "Transfers do not take place immediately; the sponsoring registrar has up to five days to respond to the request and may explicitly approve or reject the request at any time within the five-day pending period."

However, IETF members say a flaw exists in the protocol's transfer command, which doesn't specify to which registrar the domain name is to be trans-

ferred. Instead, that communication is handled by a separate e-mail. Critics of RRP say this security hole means that in the midst of transferring a domain name from one registrar to another, the owner could lose the domain name to a malicious registrar who then resells the name to someone else.

The IETF leadership is so concerned about RRP's transfer command that it has asked NSI for additional information about how the technology works.

Certificates needed?

Another criticism of RRP is that it uses passwords to identify registrars instead of the more secure method of certificates. Of concern with this approach is that if the central registry is hacked, all the registrars' passwords could be identified and would need to be replaced.

"Digital certificates are required for connection to the RRP service, but user ID and passwords are required to initiate a session," explains Rick Wesson, an IETF member and a senior software engineer at Alice's Registry Tools. "Certificates should be used instead of User ID and passwords."

Internet engineers also complain that RRP uses the Secure Sockets Layer protocol, which doesn't provide an audit trail for resolving domain-name disputes.

IETF members differ in their

views on the impact of problems with RRP.

"It's a very serious threat," says Jeffrey Williams, an IETF member and a spokesman for INEGroup, which represents 98,000 domain-name holders. "My two main concerns about RRP are that [firstly] there is a privacy exposure problem. Anybody can get in that database and get all kinds of information about the domain-name holder. The other concern is domain-name slamming. They just don't have any real good security on that protocol."

Wesson agrees that RRP does not prevent slamming, but he says registrars will have little economic incentive to switch customers without authorization. "A transfer costs [the same as] a one-year renewal, so what incentive does a registrar have to slam if they are not receiving payment before the transfer?" he asks. "Slamming doesn't appear to be a big threat."

Companies concerned about the privacy and security of their domain names should consider becoming an accredited registrar, the IETF's Gerck recommends.

"This is the only way that they could be in control of their Internet identity and deal directly with the registry," he says. □

Clarification

A recent news brief regarding Shym Technology (NW, Dec. 20, 1999, page 27) should have referred to the company's new PKEnable offering as a packaged application, not a tool kit.

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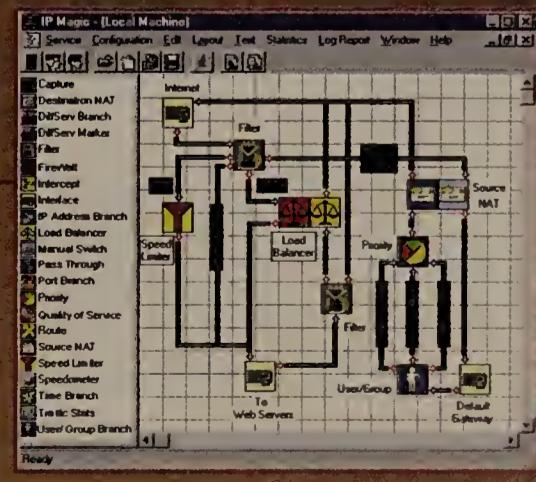
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Briefs

Cybernet Systems this week will upgrade its NetMax Linux-based thin servers to the Linux 2.2 kernel. The NetMax appliance servers will get a performance boost through support for up to 1G byte of additional RAM and an increase in the number of files that can be open at one time. The company also is adding support for Intel, Advanced Micro Devices, Cyrix processors and chipsets. The NetMax appliances include an option for symmetric multiprocessing support. Available now, the servers are priced at \$100.

Cybernet: www.cybernet.com

Sun last week said PC connectivity software vendor WRQ will now provide PC-to-Unix host connectivity for Sun customers. WRQ's Reflection products will replace Sun's Network Client and Solstice NFS Client offerings, which are being phased out, Sun says. Sun users will be encouraged to purchase WRQ's Reflection Suite for X, which allows the integration of Unix graphical applications on a PC, as well as WRQ's Reflection NFS, which lets Windows PC users access file and print resources from a Unix server. Both WRQ products are available now. Pricing for Reflection Suite for X starts at \$300 per seat; Reflection NFS starts at \$85.

WRQ: www.wrq.com/sun

Cabletron last week announced a high-speed wireless bridge designed to establish high-speed connectivity between buildings without having to install cable or lease T-1 lines.

The High Rate RoamAbout bridge conforms to the 802.11b standard for 11M bit/sec wireless data. Available now, the bridge costs \$1,799.

Cabletron: www.cabletron.com

Debate will focus on Linux vs. Linux

Vendors ready to do battle at Network World's Linux Showdown in New York.

BY BOB BROWN

When the discussion comes around to Linux, it's often about Linux vs. Windows or NetWare, or another more established operating system. But what about Linux vs. Linux?

Attendees at next month's LinuxWorld Conference & Expo will get a chance to compare the Linux offerings and business strategies of five different vendors (see graphic). Representatives from the companies — Caldera, SuSE, TurboLinux, VA Linux and Walnut Creek CDROM — will attempt to highlight what separates them from the pack as well as poke holes in their competitors' offerings and strategies.

Red Hat, the leader in Linux market share, has declined to participate. "We think this distribution vs. distribution showdown format is counter-productive to the Linux community," a spokesperson says. "Instead of clarifying anything, it will only serve to confuse."

Some observers say the differences among Linux variants are typically minimal but that there are definite differences among companies' strategies. Some firms, such as VA Linux, emphasize their turnkey software/hardware offerings, while others, such as Caldera, are talking

about everything from non-PC devices to e-commerce. Some vendors focus on servers while others are eyeing the desktop market.

The LinuxWorld panelists should be prepared to field questions on a variety of topics, including on the openness of their Linux distributions, their service and support offerings, and their skyrocketing stock prices.

Bruce Perens, an open source software pioneer and president of Linux Capital Group in Berkeley, Calif., says that not all Linux packages are entirely open source. He'd like to hear the vendors explain what is and what isn't open source in their distributions. He'd also like to hear the vendors comment on how they are giving back to the open source community. As an example, he points to VA Linux providing Web hosting for open source projects.

Bill Claybrook, a research director at Aberdeen Group in Boston, says it will be interesting to hear how the companies plan to encourage independent software

The Linux Showdown lowdown

What: A presidential-style debate featuring representatives from five key Linux suppliers.

Who: Vendor panelists are: Larry Augustin, CEO, VA Linux; Robert Bruce, CEO, Walnut Creek CDROM; Ransom Love, CEO, Caldera; John Terpstra, vice president of development, TurboLinux; and Marc Torres, president, SuSE. Expert panelists are: Bob Brown, news editor, *Network World*; April Jacobs, senior writer, *Network World*; and Nick Petreley, editorial director, *LinuxWorld*. Moderator: John Gallant, editorial director, *Network World*.

Where: Special Events Hall, Jacob Javits Center at LinuxWorld Conference & Expo in New York.

When: Wednesday, Feb. 2, 4:15 p.m. to 5:30 p.m.



Linux distributions

vendors to port their applications to Linux. "How will the Linux distributors work with the independent software vendors to provide them with a more suitable release cycle?" Claybrook asks. He says that new releases of Linux are issued much more frequently than new releases of most other operating systems, making it challenging for third-party developers to keep pace.

Linux vendors also need to clarify their efforts to deliver improved remote management technologies and support server clustering, Claybrook says. □

Foundry extends server load-balancing reach

BY JEFF CARUSO

Foundry Networks this week will give e-commerce customers more options for server load-balancing, as the company updates its switch software to match competitors' capabilities.

Foundry's Internet IronWare 6.0 distributes Web-based requests among servers in different locations, a capability that competitors such as Cisco and Alteon WebSystems have had for some time.

The new version also maintains persistent sessions, ensuring that all packets for a particular session go to the same server. The software can determine which packets belong to the session based on cookies, much like a capability Alteon announced in November (NW, Nov. 15, 1999, p.14). It can also use the



Foundry's ServerIron IronWare software uses cookies to distribute server workloads.

Secure Sockets Layer session ID to identify packets.

Intira Corp. is looking at global server load balancing to distribute loads among data centers in St. Louis, New York and Pleasanton, Calif., says Dan Rabb, lead network engineer at the company. Intira manages IT and network infrastructure for clients conducting e-business.

Distributing servers among different locations can cut down on response

times, as users can access the site closest to them. Rabb says Intira is interested in technology that ensures servers are available, keeps response time low, and helps the company meet its service-level agreements.

Although other vendors provide for global server load balancing, Foundry does it slightly differently, says Chandra Kopparapu, product marketing manager at Foundry. Others take over the features of the Domain Name System server, but Foundry's software works with an existing DNS server, he says.

Also, when Foundry's product decides which site to route requests to, it takes into account how much of a load each site already has. If a site is already receiving a lot of requests, the software will

See **Foundry**, page 24

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NIGHTS
AND
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[AND ITS IMMUNE SYSTEM IS A WONDER OF NATURE.]

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Directory-managed storage products heat up

Peerless, Gadzooks, Crossroads and SanCastle ready network storage wares.

BY DENI CONNOR

Those hoping to manage storage networks from the same console they use to manage desktops, servers and printers will get their wish — eventually.

Several vendors, including Peerless Systems and Gadzooks Networks, are indeed readying products that let management take place from network operating system tools that are directory-enabled. Peerless and Gadzooks have folded Novell Directory Services (NDS) into network-attached storage (NAS) devices, CD-ROM towers and Fibre Channel switches to improve device and policy management, security, configuration, asset control, performance and fault isolation. The companies will incorporate Microsoft's Active Directory when it is available.

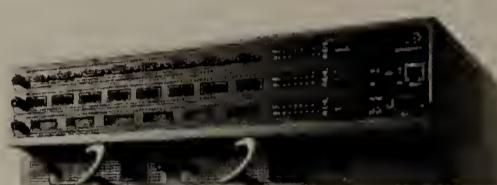
Crossroads Systems and SanCastle

Technologies are also working with Microsoft and Novell to incorporate directory management into their routers and switches.

However, analysts say these attempts to ease storage management won't garner much customer support because corporate decision-makers are reluctant to spend money on storage management applications. And most SAN and NAS vendors are trying to reinvent network and systems management software that could easily be adapted to the needs of storage.

"The storage vendors don't see it as being important to them because, for the most part, there is no demand from customers," says Dave Hill, an analyst with Aberdeen Group in Boston.

Robert Gray, an analyst with International Data Corp. (IDC) in Framingham, Mass., agrees that network execu-



Gadzooks' Capellix 3000 comes with Novell directory management support.

tives have bigger fish to fry.

"The last stuff CIOs look at is what is happening on file systems, which is where network-attached storage appliances are," Gray says. "Directory management of storage is coming, but it's not the area most senior IT managers are focusing on right now."

CIOs will soon realize the importance of their data assets and the problem of managing them without additional staff, Gray says. They'll understand that directory enabled management saves time and money because all network resources can be administered from one interface.

One Windows NT user agrees with that assessment.

"Any software that works with Active Directory is going to be of more value to us than software that has its own proprietary device management scheme," says Chuck Yoke, manager of technology architecture at mutual fund company Janus in Denver. "The last thing we want is two different packages to work with."

A recent study from IDC showed that organizations using NDS found typical gains of 20% to 30% in operational efficiency and averaged a 33% reduction in staff needed to manage servers, desktops and applications. Experts say these gains could easily be extended to storage devices managed from a directory console.

Rick Villars, an analyst with IDC, says

it is amazing to him that the storage-area network industry is trying to recreate all the things network vendors have already gone through. "It sounds as if we are back in the early days of intelligent hubs and routers," Villars says. "It is absolutely critical that storage vendors link into the directory standards, such as Lightweight Directory Access Protocol, that are developing for the Internet."

Peerless and Gadzooks use LDAP to join devices to NDS.

Peerless, a vendor of embedded network software, extended a directory agent commonly used in printers and CD-ROM drives that lets vendors add directory manageability to network-attached storage.

Peerless will also support the Netscape Directory next year, as well as extend its technology to Internet infrastructure devices, such as Web caching appliances.

Gadzooks also ships a Java applet that manages configuration, diagnostics and partitioning in its Capellix 3000 Fibre Channel switch. The applet plugs into Novell's directory management utility, ConsoleOne. □

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Foundry,
continued from page 21

choose a different site.

In addition, Kopparapu says the software measures the health of different sites, tracking how quickly packets travel between the sites and users access the data. This way, future packets are routed to the site with the fastest response time.

"The health-checking just sold it for us," says Curtis Hays, principal network architect at Infospinner, which develops application server products. The company wanted to be able to see which applications were up and running from

the viewpoint of the network gear.

Version 6.0 also uses cookies — that is, bits of data that identify users — to determine to which server to send requests. A server can tell Foundry switches that cookies of a certain type should be directed to it. Each packet from the same user in the same session can be directed to the same server. If the user is ordering multiple items from the Web site, such persistence is necessary to make sure the server manages the transaction from start to finish.

Version 6.0 is shipping now as a free upgrade to Foundry's ServerIronXL and BigServerIron switches.

Foundry: www.foundrynet.com

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THE NETWORKING MVP IS . . .

It's time to select the networking Most Valuable Player for 1999. Just like the MVP in a sport, my choice honors that person or persons who've done

the most to further the success of their network team. Previous winners were Novell's Eric Schmidt (1997) and Directory Enabled Networks co-chairs

John Strassner and Stephen Judd (1998).

Once again, this year the award will be shared by a number of players from the same company.

Two years ago, former Tivoli Chairman and CEO Frank Moss and Preferred Systems' co-founders Jack Serfass, Joe Sommers and David Sweet

joined together to start Bowstreet Software with the idea of making business-to-business e-commerce simpler.

Along the way, they found that XML was the key to creating Web-based tools, and directory services was the key to creating Web-based relationships. Serendipitously, Bowstreet put the two ideas together and Directory Services Markup Language (DSML) was born.

By itself, that's an achievement. But the play that insured the MVP award happened last June when Bowstreet convinced every significant player in the directory services arena that DSML was the wave of the future. Microsoft, Novell, AOL-Netscape, IBM, Oracle and Sun all joined Bowstreet in founding the DSML.ORG group to define and promulgate the DSML standard.

These directory provider vendors were quickly joined by directory-enabled application vendors such as Mission Critical, Netegrity, NetVision, Lotus and Oblix. By December, all had signed off on Bowstreet's definition of the DSML specification and a new public standard for Web-based, directory-enabled e-commerce applications was born.

The initial specification has now been turned over to the Organization for the Advancement of Structured Information Standards (OASIS), the World Wide Web Consortium (W3C) and BizTalk for further development. OASIS is a nonprofit, international consortium considered to be the world's leading independent organization for the standardization of XML applications in e-commerce. The W3C is an international industry consortium developing protocols that promote the Web's evolution and interoperability. BizTalk is driving the rapid, consistent adoption of XML for e-commerce and application integration.

That's an achievement for a start-up and an honor for its founders.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@vquill.com.

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Tip of The Week



I hope to see you all next week at ComNet 2000 in Washington, D.C. If you're at the show, be sure to drop by the Grand Ballroom in the Renaissance Hotel on Wednesday at 1 p.m. for another *Network World* Network Operating Systems Showdown. *Network World*'s John Gallant, John Fontana and I will be grilling and serving up Novell, Microsoft, IBM, Red Hat and SCO for your enjoyment.



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Carriers & ISPs

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Briefs

Hoping to follow on the success of Bell Atlantic in New York, SBC Communications is seeking permission to sell long-distance services in the state of Texas. Approval would come from the Federal Communications Commission after it determines that SBC has encouraged local phone competition in the state and has met other technical requirements. Last year, the Texas Public Utilities Commission fined SBC for throwing up roadblocks to competitors that want to sell digital subscriber line services there. In announcing its plans to seek long-distance approval, SBC pointed to a separate PUC document that says SBC has opened its market to competition.

SBC: www.sbc.com

Winstar Communications has announced it will add Internet data centers in Manhattan, San Francisco, Minneapolis and Brussels, Belgium to its network. The data centers will fuel the fixed wireless service provider's new application service provider and Web hosting service initiatives. Winstar's data centers in Minneapolis and Brussels are now online along with the service provider's existing data centers in Washington, D.C., Boston and Seattle. The data centers in Manhattan and San Francisco will come online later this year.

Winstar: www.winstar.com

SkyCache, the Laurel, Md., satellite content distribution service provider, changed its name last week to Cidera in order to reflect an expanded focus. Known for providing satellite caching services, the company now offers live streaming media and Usenet news feed services. Cidera comes from the Latin word sidera, which means star. Cidera: www.cidera.com

ISP competition fuels stronger SLAs

Cable & Wireless is the latest to raise the bar; guarantees have gaps, however.

BY DENISE PAPPALARDO

Service-level agreements (SLA) for dedicated Internet access offerings are stronger than ever, but many of these guarantees still lack automatic credits and real-time monitoring tools.

Last week, Cable & Wireless raised the bar on ISP performance guarantees with its latest SLAs. Cable & Wireless is offering its new DirectConnect dedicated Internet access customers a protective guarantee that they will experience an average latency of no more than 70 msec per month across the ISP's Internet backbone.

Cable & Wireless has also added a packet-loss protection guarantee of no more than 1% over one month, which a handful of other ISPs also offer.

Previously, GTE Internetworking offered the strongest latency guarantee to its dedicated Internet access customers, with its SLA stipulating an average of no more than 75 msec of latency over the ISP's network per month.

The fact that ISPs are taking SLAs to the next level is good news for customers, says Jim Slaby, senior analyst at Giga Information Group, a Cambridge, Mass., consulting firm. Other business-class ISPs will soon follow suit or add new SLA parameters, he predicts.

UUNET started offering business

users aggressive performance guarantees 18 months ago with its latency guarantee of no more than 85 msec over its Internet backbone. At the time, most ISPs weren't even offering protection guarantees on latency. So while Cable & Wireless is leading the pack today, the race is far from over.

If Cable & Wireless fails to meet its

providing business users with real-time monitoring tools that measure latency, packet loss and network availability. These tools would be especially helpful to business users, such as BMW Manufacturing. The auto manufacturer is diversifying its dedicated Internet access connectivity by working with at least three ISPs to ensure reliability,

Competitive SLAs

ISP service-level agreements, which are typically based on monthly averages, have improved over the past 18 months, but most ISPs' guarantees still lack a strong bite when it comes to compensation.

ISP	Minimum latency	Minimum packet loss	Network availability	Compensation	Proactive
Cable & Wireless	70 msec	1%	100%	3-day credit on port charges	No
GTE Internetworking	75 msec**	10%**	100%*	3-day credit	No
PSINet	85 msec	1%	99%	1-day credit	No
UUNET	85 msec	No	100%*	1-day credit	Yes

*including local loop connection. **10-minute average

latency or packet loss SLA, the ISP will offer customers a three-day service credit, which does not include any local loop service costs. DirectConnect customers can access Cable & Wireless' secure monitoring site, which will include monthly reports on the ISP's performance.

This site is the only tool that will allow Cable & Wireless users to see whether the ISP has met its guarantees for the month. If customers don't go to the site but point out to Cable & Wireless that latency was averaging more than 70 msec for the month or that packet loss was over 1%, they will not get the credit. UUNET seems to be one of the only large ISPs offering customers proactive credits if it does not meet SLAs.

But there is a hitch to UUNET's so-called proactive crediting procedure. UUNET has to sustain more than 85 msec of latency for two consecutive months before its credit kicks in. Just about all of the other ISPs base their credits on one-month averages. UUNET and PSINet are offering one-day credits to customers when the respective ISP fails to meet an SLA, whereas GTE Internetworking and Cable & Wireless are offering three-day credits.

One area where all ISPs are lacking is

says Sim Wright, coordinator of information technology at BMW Manufacturing in Spartanburg, S.C.

Knowing which ISP has the lowest latency at any given time could help users reroute traffic, especially when trying to send large files over the Internet. But today, business users are at the mercy of their ISPs' monthly reports.

Although the Cable & Wireless SLA is a positive step for business users, there is one downside for existing DirectConnect customers. These users will have to draw up new contracts with Cable & Wireless to take advantage of the stronger guarantees.

Customers shouldn't expect to pay higher monthly fees by drafting new contracts, according to Dave Savino, director of IP product management at the ISP.

But because Cable & Wireless has to set up access configurations for each customer to view the monthly performance Web site, the ISP is requiring that users request the SLAs and register for the site, Savino says. □

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SORTING THROUGH SLAs

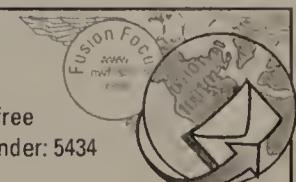
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Wan Monitor. Daniel Briere and Christine Heckart

TELECOM 'TEA LEAVES' FILL T-SHIRT DRAWER

Have you checked your underwear drawer lately? In there you will find the future success stories of the telecom industry.

We swear it...just check.

A quick inventory of Danny's "wardrobe" indicates that telecom is all about these garments. Every year about

this time, he cleans out his closet of all the excess T-shirts, caps, boxer shorts, golf shirts, etc., that bear logos from companies. The trick for vendors is to

stay in the drawer through this "winter purge," as Danny's wife (who instigates it each year) fondly calls the task.

Let's see what we find in this year's collection:

Oldest shirt: A Teleos Calvin and Hobbes T-shirt that reads: "It's crazy around here." (Remember Teleos? The would-be competitor to Ascend swallowed by FORE?)

Latest shirt: A Ramp Networks bright red T-shirt saying "DSL is Hot" (came complete with salsa, chips and red plastic cups). This one's the most significant because it is the only red garment Danny has and, therefore, served as his primary Christmas garb.

Most identical: Four of the same NetSpeed T-shirts. NetSpeed put most of its money into marketing, and almost everyone has its T-shirts. While Cisco bought it years ago, the company is still a reference point. Ever hear people talk about Amati, Performance Telecom or other former DSL flames? Nope. No T-shirts in the drawers, that's why.

Most obsolete: Two *CommunicationsWeek* T-shirts that still wear well but somehow are just not pertinent anymore.

Favorite shirt of spouse: A Copper Mountain denim shirt with howling wolf — nice feel after many washes.

Most comfortable: A T-shirt from Jordan Telecom made of Egyptian cotton. Wow, what a feeling. All T-shirts should be made from Egyptian cotton.

Most noticeable: TimeSteps' Awesome Powers (get it? Austin Powers?), which always causes a double take as people try to read it. No good follow-up for non-telecom people, but they like the shirt.

Largest number of T-shirts from one vendor: Ascend shirts...another fabulous marketer. It helps you understand why Ascend's marketing worked and why its stock went out of sight.

We hate to generalize, but the most successful companies tend to be those having the most consistent presence in the T-shirt drawer. It is the consistent presence over time that shows their continuous marketing and, if they remain year after year, it is reflective of their ability to stay in business.

Before you move on and say this is superficial as all get-out, think about it. T-shirts mean consistent and frequent exposure over a period of time. Boxer shorts are (usually) hidden. Caps are not really worn all that frequently by non-employees. Golf shirts and other trade show-like shirts make you feel like you are endorsing the companies too much.

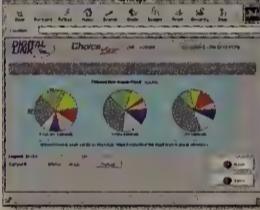
T-shirts are the right middle ground. The more you see them, the more you can be sure of a company's future success.

Briere is president and Heckart is vice president of TeleChoice, a consultancy in Boston. They can be reached at dbriere@telechoice.com and checkart@telechoice.com.

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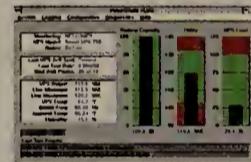
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Four years after telecom act, impact on prices mixed

BY TIM GREENE

Have you noticed how the data bills from your regional Bell operating company have dropped since the federal Telecommunications Act of 1996 kicked in nearly four years ago?

Maybe not. But if you have, you might want to hold off on crediting the law, which was intended to promote competition that would drive down RBOC telecom prices.

Customers, analysts and the RBOCs say data prices have not declined that much and when they have, other factors have prompted the changes. In particular, they point to competition from carriers that would have entered the market anyway, plus new technologies that support similar services for less.

"The telecom act didn't open floodgates as envisioned," says Karl Garland, an analyst at Current Analysis in Sterling, Va.

In fact, some users say they have seen no data price improvement from the RBOCs since the telecom act. "We have 16 offices in pretty much every RBOC territory, and we haven't seen any drop in these rates," says Ken Lund, IT manager for Allen Lund Co., a transportation broker in La Canada, Calif. His firm uses T-1s to connect voice and data networks at the company's sites.

Others see some positive effects of the law. Rich Glasberg, manager of data services for the Massachusetts state government, says he has noticed one improvement: Bell Atlantic has dropped its mileage charge on frame relay lines. "So I guess I would say the telecom act wasn't an altogether bad thing," Glasberg says.

So far, most RBOCs have been unable to win the one positive incentive the telecom act offers them to reduce prices: the right to sell long-distance service out of their home territories. The lone exception is Bell Atlantic, which last month won the right to sell long-distance in New York. Bell Atlantic has yet to announce any price changes.

RBOCs are reluctant to change their prices because it means changing their tariffs, or the legal postings of what services cost, says Melanie Posey, an analyst with International Data Corp. (IDC) in Framingham, Mass. It is a complicated process that has sweeping results, so they try to avoid it. "Rather than filing a new tariff, it's easier for them to play around on the margins," she says.

By that she means offering unadvertised discounts based on the total amounts customers spend on services or the length of their contracts. So while the rate is officially the same, discounts get bigger for those organizations that spend lots of money or lock into services for a long time.

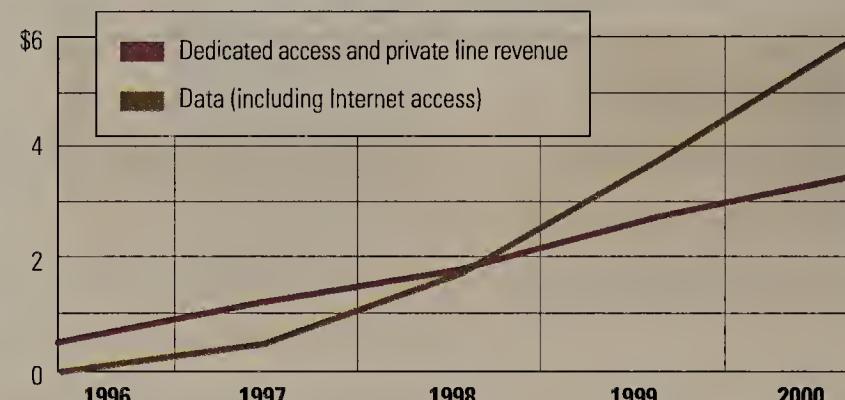
And neither the RBOCs nor their challengers, the

TELECOM REFORM

As the telecom act approaches its fourth birthday, carriers and customers don't give it much credit for lowering data prices.

Competition takes its toll

Increased competition from competitive local exchange carriers is taking revenue away from the traditional local carriers, the RBOCs. That battle for customers is contributing to lower prices for data services.



Note: Dollar figures in billions

SOURCE: NEW PARADIGM RESOURCES GROUP, CHICAGO

competitive local exchange carriers (CLEC), want to cut prices so much that their profit margins waste away.

"CLECs aren't interested in starting a price war for data," Posey says. "If everybody cuts their prices, what's in it for them in the long run?"

The likely place for a price war is customer services, such as dial-up Internet access and phone service, she adds.

"If you reduce services to commodities, anyone can beat an RBOC and sell the service to you for 20% cheaper. That's easy," says John Tramontin, director of data services at BellSouth Business. "We try not to get pulled into those price wars."

Instead, the RBOCs are bundling their simple transport services, such as T-1, with other features, such as managing routers or providing Internet access. Data services for business are high-margin, and carriers need to keep them that way to ensure revenue.

CLECs coming into cities to challenge RBOCs

employ a similar strategy, offering integrated access services that combine different types of traffic on a single T-1, for example.

Customers pay more than they would for a single T-1. However, the customer saves overall because CLECs squeeze more traffic onto that one line, which means the customer requires fewer T-1s, Current Analysis' Garland says. "Everything is going through it to wring the last bit from a T-1."

Glasberg suggests that newer technologies, such as ATM, eventually will replace more mature ones, such as frame relay. He says Bell Atlantic ATM pricing has dropped enough in Boston to warrant using a single ATM DS-3 connection rather than multiple frame relay T-1s to a central site on his frame network. "ATM prices are dropping to make it more attractive vs. frame relay. After all, Bell Atlantic has a hell of an investment in ATM," Glasberg says.

Another weapon CLECs use is the advantage of not having an existing network, according to Robert Rosenberg, president of Insight Research, a Parsippany, N.J., telecom market research firm. That lets them build with new technologies.

RBOCs naturally try to hold off lowering prices for as long as they can, but competitors force their hand when they embrace digital subscriber line (DSL), local multipoint distribution services and other high-speed technologies, Garland says. RBOCs have no choice but to respond.

The prime example is DSL, which promises T-1-like bandwidth for a fraction of the cost. This has already chipped away at T-1 prices and should continue as other high-speed access services, such as cable modems and broadband wireless, become more prevalent, IDC's Posey says.

Glasberg says he is looking at DSL as a less expensive way to connect offices to the state's network resources. At the same time, he is getting indications that Bell Atlantic will drop its frame relay prices. "Now I see the impetus as other WAN media start to pop up," Glasberg says. "DSL will be a strong player."

Customers have had success finding lower prices by shopping around. For example, Lund says he stopped hassling with RBOCs to buy T-1 access to long-distance providers. Instead, he buys a long-distance package that includes the local loop at a rate far below what the RBOCs charge. The long-haul carriers are willing to eat some of the cost to win the long-distance business, he says.

If prices aren't dropping fast enough for you, take a tip from Glasberg and demand better deals. "My satisfaction is probably what it was before the telecom act," he says. "But when I'm not satisfied, I beat the drum." ▀

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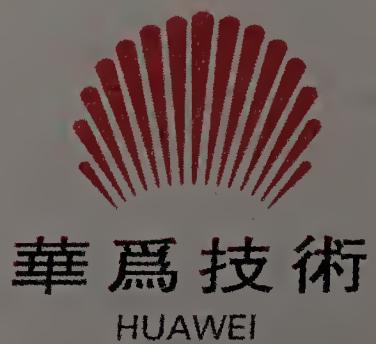
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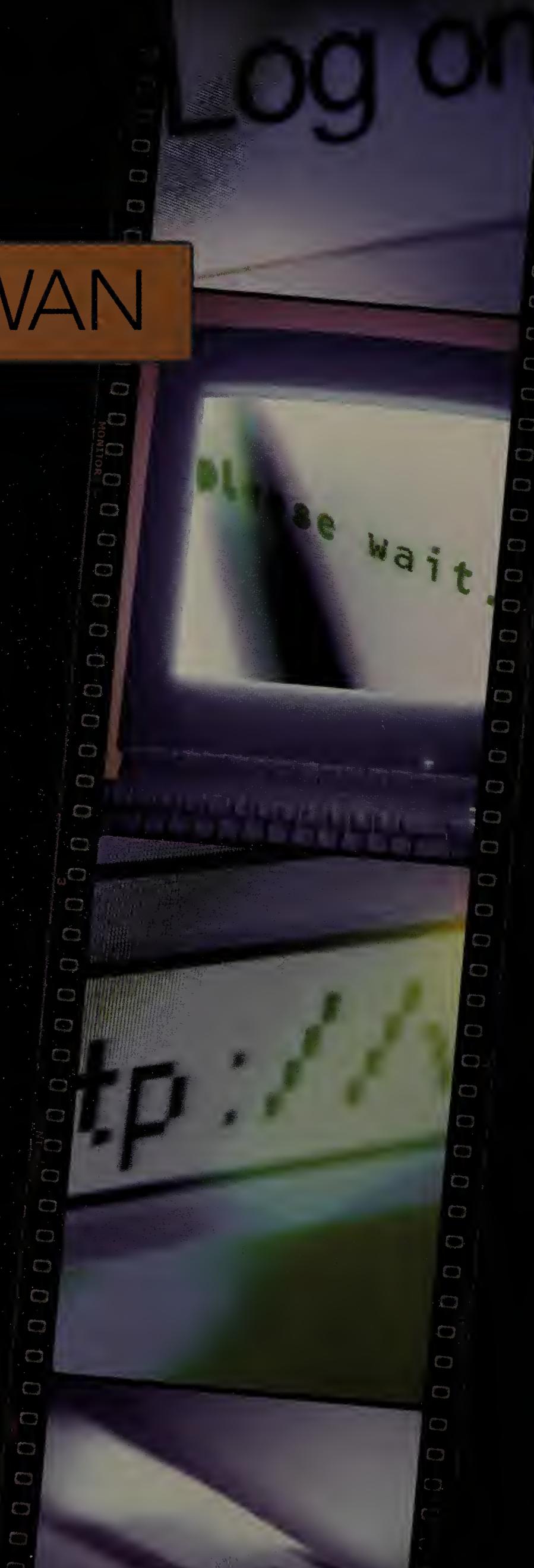
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Briefs

@Stake, a Cambridge, Mass., security services start-up consisting of businessmen and hackers, has announced that it has received \$10 million in initial venture capital funding from Battery Ventures. The company's mission is to help organizations build secure e-commerce systems by safeguarding network connections, applications and content. The company lineup includes Chairman John Rando, formerly a Compaq senior vice president; Vice President of Marketing Ted Julian, formerly of Forrester Research; and the vice president of research and development, who simply goes by the name Mudge. Mudge served as CEO/chief scientist at L0pht Heavy Industries, a hacker think tank.

@Stake: www.astake.com

The Burton Group, a Midvale, Utah, research and consulting firm, has acquired fellow research and consulting firm **NetReference** of Sterling, Va., for an undisclosed sum. The Burton Group, led by Jamie Lewis, has made a name for itself with its research on network services, such as directories and security. NetReference, founded by David Passmore, has focused more on researching corporate and public network infrastructures.

Bluestone Software, a Philadelphia maker of Java and XML server platform software, has announced that a dozen additional independent software vendors (ISV) have committed to building applications to work with Bluestone software. The ISVs include help desk software maker Brickhouse Data Systems, publishing software company Creative Sun and others.

Bluestone: www.bluestone.com

Lotus partners to exploit Domino R5

Third-party developers taking advantage of Domino R5's XML support, Web-like interface.

BY JOHN FONTANA

ORLANDO — Enterprise customers know the real value of Lotus Domino is in its use as a platform for applications that take advantage of the server's collaboration and messaging features. So this week at Lotusphere 2000 in Orlando, Lotus' business partners will show off applications that exploit new Domino R5 features, such as support for XML.

■ "XML is really appropriate when developing applications for an Internet world, and it helps make Domino a true Web-application server."

Lars Johansen, president, IT Factory

Some of the companies have tools that help network managers monitor Domino servers and messaging environments, which are taking on record

loads of application and Web traffic. Still others are adding features to their applications to exploit the Web-like R5 interface.

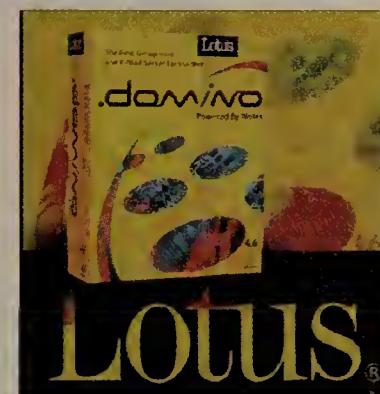
IT Factory, one of Lotus' largest business partners, may be taking the most dramatic steps. The company this week will introduce its eComponent Architecture, a development suite that allows components developed for applications that run on Notes clients to be used outside of the Domino server.

The components rely heavily on XML, for which Lotus has added support into R5 specifically to spur integration with other back-end servers.

IT Factory is using XML to provide a standard interface into Notes components, such as mail merge or communication between databases.

"IT Factory is trying to supply higher-level components to reduce low-level coding many Domino developers have had to do," says Matt Cain, an analyst with Meta Group in Stamford, Conn. "Their architecture extends a link from Domino to other systems."

The eComponent Architecture includes tools for running, building and installing components.



Better management tools are on the way for Domino.

The eComponent Builder replaces IT Factory's software developer's kit, which was proprietary to Domino.

"XML is really appropriate when developing applications for an Internet world, and it helps make Domino a true Web-application server," says Lars Johansen, president of IT Factory.

eComponent Architecture is expected to ship in the next several months. Pricing has not been set.

Management tools

While IT Factory is trying to pry open Domino, other vendors are providing tools to manage things such as server and messaging performance.

Tally Systems will introduce Veranda for Domino, a tool to track mail usage. Veranda has features specific to R5, such as message tracking, which can find the whereabouts of any individual message.

Veranda also is integrated with the new R5 directory so it can track messages based on groups of users, departments or servers.

Veranda can be used for capacity See **Lotusphere**, page 40

E-mail security products to launch at RSA show

Viasec, Content Technologies and Tumbleweed to show off new wares.

BY CAROLYN DUFFY MARSAN

SAN JOSE — Messaging vendors this week will unveil a host of e-mail security products at the RSA 2000 show in San Jose. Companies making announcements include Viasec in Donegal, Ireland, and Content Technologies in Kirkland, Wash.

"The RSA show is becoming more important for the security industry," says Ian Poynter, president of Jerboa, a

RSA Conference 2000

security consulting firm in Cambridge, Mass. "We see more activity there."

Viasec will announce Consus 2.0, a secure e-mail gateway that encrypts and authenticates messages coming into and going out of a company's network via the Internet. Consus works with any Simple Mail Transfer Protocol-based e-mail system and supports the Secure Multi-purpose Internet Mail

Extensions (S/MIME) e-mail standard. It uses strong encryption algorithms up to Triple-Data Encryption Standard. A certificate management system and certificate authority are built into the software for generating digital signatures. Consus is server software that runs on Windows NT.

The new version of Consus adds load-balancing tools that lets the software run simultaneously on as many as 12 servers. Previous versions worked

See **RSA**, page 40

Enterprise Applications

Lotusphere,
continued from page 39

planning, infrastructure planning or load balancing," says Joanne Egner, product manager for Veranda, which is expected to ship in March.

Pricing starts at \$2,000 for 100 users.

Also at the show:

- BMC Software will debut a monitoring tool. The company's Patrol for Lotus Domino 4.3 monitors R5 clusters and partitions. It also tracks response time between clients and servers. Patrol comes with 30 pre-built reports that evaluate server statistics and the availability of Notes databases. Patrol is expected to ship next week and is priced at \$525 if purchased before April 1.

- Momentum Business Systems will release Boomerang 3.5, a version of its travel expense management system that now features an analysis module, which lets users create static and ad hoc reports. Boomerang 3.5 is expected to ship by the end of the month. The server is priced at \$5,000 and per-seat licenses are \$65.

- Stampede Technologies will unveil TurboGold for IBM's AS/400 and RS/6000 AIX. TurboGold accelerates the replication of Lotus Notes databases to and from mobile or remote users as well as between Domino servers. TurboGold will ship in the first half of this year. Single server prices start at \$6,295.

IT Factory: www.itfactory.com; Tally Systems: www.tallysystem.com; BMC: www.bmc.com; Momentum: www.boomerang.momentum.com; Stampede: www.stampede.com

www.nwfusion.com

LOOKING INTO LOTUSPHERE

Agenda: Figure out what to do at the show.
Webcast: Watch all the action from your desktop.
Updates: Stay on top of the news with our daily reports.

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DocFinder

RSA,
continued from page 39

on a single server only.

"The new version opens us up to the enterprise market," says Maurice McMullin, chief technical officer at Viasec. "Now we have the redundancy and scalability to support large organizations."

McMullin says geographically dispersed companies can run the new version of the software on servers at multiple sites over a WAN. A single management console can oversee the software at all the locations. "We're not using loads of bandwidth, keeping all the servers in sync," he says.

Pricing for Consus 2.0 will range from \$80 per seat for a 25-user package to \$30 per seat for a 1,000-user package, McMullin says.

The improved fault tolerance of Consus 2.0 "will allow us to discuss the product with a lot more of our customers," Poynter says. "This functionality is essential to place it in larger corporations."

Jerboa has been using earlier ver-

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sions of Consus to encrypt and digitally sign all of the firm's outgoing e-mail. The company's experience with Consus has been positive.

"We haven't noticed any delays," Poynter says.

Content Technologies, which sells the popular MIMEsweeper e-mail content management and security software, will announce a new product geared toward application service providers, a spokeswoman says.

Meanwhile, Tumbleweed Software in Redwood City, Calif., will demonstrate its new Java-based S/MIME software, which doesn't require any S/MIME on the recipient desktop. The Java applet was announced last year.

Viasec: www.viasec.com; Content Technologies: www.contenttechnologies.com; Tumbleweed: www.tumbleweed.com

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'Net Insider . Scott Bradner

WHY DOES THIS FEEL WRONG?

To start off the new year, President Clinton announced an ambitious plan to combat cyber-terrorism called the National Plan for Information Systems Protection. In the announcement, he said all the right things.

So why am I worried that the plan is a bit off target?

The plan (www.whitehouse.gov/WH/EOP/NSC/html/documents/nisp-execsummary-000105.pdf) consists of 10 programs. They include figuring out what the critical infrastructure components are, monitoring the Internet to detect intruders who might attack the critical infrastructure components, making sure that law enforcement knows what to do, sharing information on attacks and ensuring that there is a way to react to an attack. The programs also

include supporting research on intrusion detection, supporting students who want to go into this area, making sure people understand there is a problem here, passing some new laws, and lastly, ensuring that all of the above do not violate rights of American citizens.

But reading the plan makes it clear that a primary focus is to finish deploying the Federal Intrusion Detection Network (FIDNet) announced last summer. FIDNet is a set of intrusion-detection monitors — 500 in the first phase — installed on government networks. Its aim is to determine when systems have come under attack by monitoring network activity. Observers expressed a great deal of concern over FIDNet's impact on individual privacy when the plan was first announced. Since then, the

concern has increased with the discovery of Echelon, a worldwide Internet monitoring system operated by the spy agencies of the U.S. and four other countries.

It is all well and good to watch networks to see if resources are under attack, but it would be more effective in the long run to put some effort into actually protecting the resources by making them harder to attack. A primary way of doing this is to increase the use of encryption to protect management protocols and other communications. This new plan does include a timetable that encourages the use of encrypted e-mail within the Department of Defense by 2001 but otherwise ignores the adage that a little prevention can avoid a lot of after-the-fact cure.

It is consistent for this administra-

tion, however, to omit encouraging the general use of encryption from its plan. The administration has not yet internalized the fact that the bad guys already have effective encryption and that holding back research on better encryption technology and encouraging its use by the general Internet user just makes it harder to protect the very infrastructure that the administration worries about.

At this stage, the administration's plan does not assuage the worry over FIDNet and does not seem to address in any useful way protecting the Internet infrastructure. Not an auspicious beginning to the century.

Disclaimer: To Harvard, this is just another century, not a big deal. Thus, the above lamenting is my own.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@sobco.com.



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Technology Update

An Inside Look at the Technologies and Standards Shaping Your Network

Ask Dr. Intranet

By Steve Blass

We are working on a network management system for our intranet using an HP-UX 735/125 running HP-UX 10.02, and we need some help getting a baseline for patches installed. On Solaris, we would download the latest patches. But we can't find a similar service for Hewlett-Packard patches. Can you help?

You can get a list of installed HP-UX software, including individual patches, by executing the command "swlist -l product" as root. The command "swlist" by itself will show patches at the bundle level. HP-UX 10.20 is probably where you want to be. HP-UX 10.20 and 11.0 are fully supported and Y2K-friendly. Operating system patch bundles are at HP's Support Plus Web site at www.software.hp.com/SUPPORT_PLUS. Individual patches and HP Self-Solve tools are available at the HP IT Resource Center; go to us-support.external.hp.com, and click on Maintenance/ Support. Also search HP's online Technical Knowledge Base for support information by product. Other sources of system administration information include mirrors of the HP-UX Porting and Archive Centre at hpx.csc.liv.ac.uk/hppd, where you can find the FAQ from the comp.sys.hp.hpx news group, and interex.org, home of the International Association of Hewlett-Packard Computing Professionals. You may want to look at patch management software at www.interex.org/tech/9000/patchtools.html if your intranet has multiple HP-UX servers.

Blass is a network architect at Sprint Paraben in Houston. He can be reached at dr.intranet@paraben.com.

Protocol helps stretch IPv4 addresses

BY MIKE BORELLA

In IPv4, the current version of IP, supports more than four billion addresses. Considering the Internet's phenomenal growth, however, that represents a relatively meager allotment.

To extend the reach of the IPv4

or thousands of hosts behind a single public address. The NAT device differentiates among the PCs by translating their port numbers into unique values.

But NAT is limited by applications such as streaming media that transmit IP addresses or port numbers in the payloads of packets. Such applications

that removes the translation burden.

The RSIP protocol works via a simple challenge-response structure, and employs a vocabulary consisting of "parameters" and "messages."

Operation begins when RSIP client software in a PC signals the RSIP server software in a boundary router or gateway. Through this exchange, the RSIP client requests a public IP address, plus one or more of the router/gateway's ports.

In reply, the router/gateway's RSIP server software assigns a public IP address and one or more port numbers, in addition to lease time, tunnel type and other parameters. When the packet hits the RSIP server/gateway, the packet's uniqueness is identified by the combination of assigned IP address and port numbers.

As with NAT, the RSIP server uses a reserved IP address, such as 10.0.0.4, for its own internal-enterprise addressing scheme. But unlike NAT, the boundary device gateway does not have to possess the intelligence to perform the translation; instead, the RSIP server/gateway sees the information it needs in the packet header, then consults its RSIP table to determine where the packet should go.

It's clear that RSIP represents a big improvement over NAT. For instance, with a simple extension, RSIP can support end-to-end IPSec, even though IPSec encrypts port numbers. Still, the two techniques have much in common, and this will work to the advantage of users.

RSIP promises two important advantages. Its close ties with the NAT addressing scheme bring backward compatibility, a benefit to the thousands of NAT users who will prefer to migrate gracefully to RSIP. And because the RSIP protocol employs preparatory signaling, RSIP is suited to policy-driven networking.

Mike Borella is a senior architect at 3com. He can be reached at mike.borella@3com.com.

Correction

A chart published with the Jan. 10 Technology Update article incorrectly described a difference between high-bit-rate digital subscriber line (HDSL) and HDSL2. HDSL provides T-1 service over two copper pairs, while HDSL2 uses only one copper pair to provide that same level of service.

HOW IT WORKS

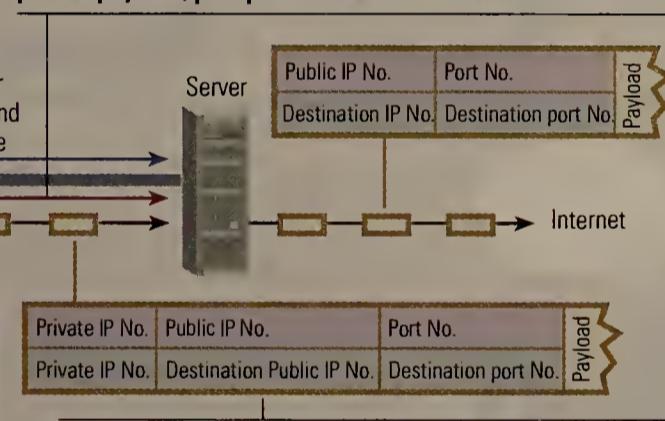
Realm-Specific IP moves beyond NAT

Realm-Specific Internet Protocol (RSIP) — currently within the Network Address Translation (NAT) working group of the IETF — lets an enterprise shield many private Internet addresses behind a single public Internet address without experiencing the performance and reliability limitations that are inherent with NAT.

1 The RSIP client begins the process by requesting registration with the RSIP server. The server responds by issuing a simple ID number.

Assignment request
Assignment response: Public IP No. and Port No.
Source address data
Destination address data

2 The RSIP client uses the RSIP protocol to request network resources, including public IP address, number of ports and lease time. The server responds with detailed information, including public IP address, which can be inserted into the packet payload, plus port numbers and the actual lease time.



3 Client sends the packet, which contains both private and public addresses. The RSIP server strips off the private address header — the server keeps this information in an internal table — and sends the packet with a public IP header.

address space, companies have turned to using private IPv4 addresses through a public-to-private address translation technique known as network address translation (NAT).

But this method has a number of limitations. So a new technique called Realm-Specific Internet Protocol (RSIP) promises to pick up where NAT leaves off.

NAT works by using the several million private addresses that have been put aside by the Internet Engineering Task Force, turning a public IP address such as 192.168.136.22 into a private address, such as 10.0.0.4, for delivery to a user's PC. Private IP addresses cannot be "seen" by the Internet, and therefore may be reused by various enterprise networks.

In conjunction with a NAT-enabled gateway or router device, a privately addressed network may hide hundreds

require that NAT take on application-specific knowledge and perform additional computation.

Worse, because NAT typically resides in a boundary router between private and public networks, it can't function with IP Security (IPSec), the popular encryption technology for virtual private networks. IPSec requires true end-to-end handshaking in order to set up initial encryption rules. Once encrypted at a client system, IPSec packets cannot be modified — or recognized — by NAT.

Like NAT, RSIP translates between public and private IP addresses. But instead of requiring a boundary router to translate, RSIP uses a simple protocol between a user's desktop PC and a boundary router to perform preparatory signaling. Through this signaling, the PC is able to prepare each packet in a way

Gearhead — inside the network machine . Mark Gibbs

WEB FORMS: THE THIRD AND FINAL CHAPTER

In the past two Gearhead columns, we began to explore the question: "How does a Web server application get data from a form?" This week, we'll wrap it up.

The first week we covered what goes on in an HTTP transaction, and last week we discussed the mechanism of a GET request:

```
GET /cgi-bin/myapp.pl?search=Gearhead%20columns&hits=10
HTTP/1.0
```

User-Agent: xxxxxxxx

Accept: image/gif, image/jpeg, */*

But last week we made a mistake: The form we showed that was supposed to generate the above request was missing the ACTION (the program we want to run — if you spotted this, award yourself a point). The form should have read:

```
<form action="/cgi-bin/myapp.pl"
method="GET">
<p>Search term: <input type="text" name="search" size="20"></p>
<p>Number of hits: <input type="text" name="hits" size="20"></p>
<p><input type="submit" value="Submit"></p>
<p><input type="reset" value="Reset"></p>
```



</form>

As we also mentioned last week, GET isn't the only mechanism by which data is passed to a Web server. This is good because the amount of data that can be passed by a GET request is limited by the size of the "environment" made available by the Web server's operating system.

To overcome this restriction, the POST method is available. To use it with the above form, the first line defining the form should read:

```
<form action="/cgi-bin/myapp.pl"
method="POST">
```

Now instead of putting the form data in the requested URL, the data is in the HTTP body (which follows the header we have come to know and love, and a blank line), thusly:

POST /cgi-bin/myapp.pl HTTP/1.0

User-Agent: xxxxxxxx

Accept: image/gif, image/jpeg, */*

```
search=Gearhead%20columns&hit
s=10
```

Because we don't use the QUERY_STRING environment variable, how does form data get to the application? By the program's standard input (usually written as "STDIN"), which is the way programs receive keyboard input. Let's look at a Perl script to handle our form data:

```
01 #!/usr/local/bin/perl
02 &parse_form_data ("my_form");
03 print "Content-type: text/plain",
"\n\n";
04 print "You want ", $my_form
{'hits'}, " hits from ", $my_form
{'search'},;
05 exit(0)
```

Line 1 is a standard bit of Perl we'll gloss over for brevity's sake. The next line is a call to a subroutine called parse_form_data that breaks up the incoming data into key-value pairs and sticks them in an array. The subroutine is smart enough to know the method used in the request and to retrieve the key-value pairs from the

right places. It then builds an array, which in our case is called my_form. In Perl this is an associative array, which means we can retrieve items from the array by name.

In terms of complexity, parse_form_data is not bad because Perl makes such string handling easy. That said, it is long and complex enough to have to leave it at that (if you are interested in the code send a message to parse_form_data@gibbs.com).

Line 3 is where it gets more interesting. We print to the standard output (called STDOUT), and rather than the data going to the printer, it is handled by the Web server. What we are printing is an HTTP response header. This header says what content type we are returning to the browser and includes a blank line that delimits the header from the response body.

In Line 4 we reference the keys to get the associated values and print them out. Actually there's more to the response header that is, by default, automatically added by the Web server. However, there in three columns is an overview of handling Web forms.

Responses to gh@gibbs.com.



Help Desk

A reader is having a problem installing Windows 2000 Release Candidate 2. Although the install starts normally, it hangs during the "Starting Windows 2000 ..." section. The screen goes blue, and the process stalls out. The reader has an Intel Celeron 400 with 64M bytes of RAM. He suspects his dual-boot system, which he runs with Windows 98/NT and Linux. Help Desk Editor Ron Nutter encourages the reader to check out the

Hardware Compatibility List

and make sure his system is there. Find out what else Nutter recommends.

DocFinder: 6427

Mega merger?

America Online and Time Warner are combining, but what's the upshot for network managers? Look at the battle between AOL and AT&T over access to cable subscribers. Could a similar struggle ensue with this pairing? Also, what are the antitrust possibilities?

The joining of a major content provider and a major cable house might prove too much for the Department of Justice to fathom. Hasn't U.S. policy always been to separate delivery from content? Log on to our forum, and let us know what you think.

DocFinder: 6428

NOS Showdown

Network operating system (NOS) vendors are eager to tell you how different their systems are. But when it comes right down to it, what do network managers need to know to make the big purchasing decisions? What questions do you pose when you come across vendors ready to sell you on their systems? Give us your criteria list and we'll put it on our question list for vendors participating in our NOS Showdown at ComNet 2000. Find out what Microsoft, Novell, SCO, Red Hat and IBM have

to say to you.

DocFinder: 6429

Predictions

"Keeping Current" columnist Fred Mc Climans has a list of predictions for the year. First, he says Microsoft will be split up. But that won't stop other megamergers, he says. Just look at the AOL/Time Warner matchup. Another battle will be on the global front, with countries sparring over who controls domains, taxation and privacy. Mc Climans says culpability on the Internet will be on the rise as misuse runs rampant. Watch to see who is brought to justice over misinformation online. Universal wireless access will still be a no-show, he adds. What else is on the horizon? Log on to find out.

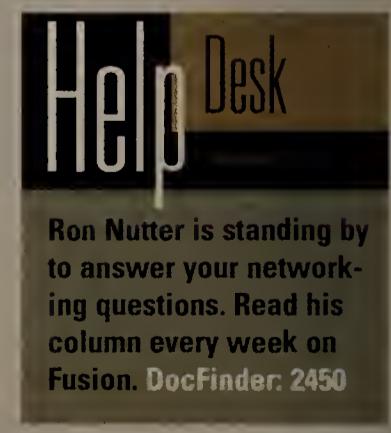
DocFinder: 6430

HDSL2

High-bit-rate digital subscriber line (HDSL) is hip on

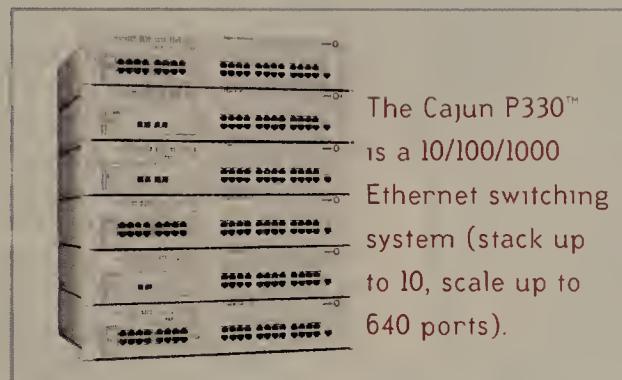
two wires, but what happens when you run it on one? The new HDSL2 lets users save money and resources. While the price of raw copper may be low, the cost of installing new copper facilities is higher than ever. That means carriers must do whatever they can to leverage their existing copper infrastructures. Enter HDSL2, which uses only one copper pair to provide the same level of service as its predecessor HDSL. Find out how it works.

DocFinder: 6431



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Editorial

Midas touches AOL

Remember a few years ago when the business fad du jour was asking yourself what business you were in? Well, someone at America Online must have taken it seriously because the company's acquisition of Time Warner last week was about just that.

While AOL is an Internet company in that almost 70% of its revenue comes from people who pay for the right to dial in to its network, AOL knows it isn't in the modem and trunk business. It is a media company that makes money by generating content that attracts paying subscribers, which in turn attracts advertisers. The Internet just happens to be the delivery vehicle.

But the Internet also happens to be King Midas. Five-billion-dollar AOL has a market cap of around \$142 billion, while the \$28 billion Time Warner, the largest media and entertainment company in the world, only musters a market cap of \$110 billion.

So Wall Street's fascination with Internet stocks enables a company with 22 million subscribers and a handful of other assets to swallow an entertainment behemoth whose magazine group alone has 120 million subscribers, to say nothing of the customers reached by its TV, cable television, music and movie units.

What does that mean for enterprise business users? There are a few broad implications:

- Integrating Time Warner assets such as CNN into the AOL fold will make for a richer online experience, which will in turn attract more users to the Web, increasing your potential market reach and changing the types of services you can offer.

- Together AOL and Time Warner will have the incentive to push multimedia advances, everything from the online delivery of music and movies to simply improving the multimedia experience for your average browser. This may up the bar in terms of what users expect online and force you to keep up.

- Adding significant cable TV holdings to AOL changes the dynamics of the whole cable TV open access debate. AT&T has fought AOL and others who are calling for access to AT&T's huge cable holdings. But the acquisition of Time Warner may move the sides closer together because AOL will suddenly have its own cable plant to protect, and AT&T might want to strike a deal to get access to those cable TV facilities.

If nothing else, this deal is emblematic of the maturing of the Internet as a mainstream business medium, which means more money will be devoted to making it more reliable, secure and robust.

— John Dix
jdix@nw.com

Message Queue

WOMEN IN IT

Regarding your article "The critical shortage of women in IT" (NW, Nov. 22, 1999, page 53):

I am a 35-year-old IT manager. Did it ever occur to anyone that not everyone is fitted to the IT world — women included? Most women just don't have the stomach for this business. I have given up having children, worked 80-hour weeks and have no social life. Not everyone wants that kind of life. Not many men want a wife that does that (although women accept this of men). IT is always billed as a "sexy" job — high pay, high visibility and high prestige — but it comes with a heavy price that seems to affect women more than men.

Lisa Vigneron
Stafford, Va.

Regarding the letter on women in IT by D. Corum (NW, Dec. 13, 1999, page 54):

Ms. Corum simply doesn't have a clue about the psychological and cultural vortex she's operating in. While there's no quick fix for her problem, I would have apprised her of the very insightful coverage of this phenomenon by Dr. Deborah Tannen in *Talking 9 to 5* and many other important related works.

Had Ms. Corum been so informed, she would have been aware of what was happening; not because of her personally, but the way status, position and upmanship is affected on our generally male-dominated business world. Thus informed, Ms. Corum could focus on a more productive process than whining to the public.

Art Allen
Saratoga, Calif.

THE REAL SHORTAGE

Regarding your article on the H-1B visa program ("Using your visa card," NW, Dec. 13, 1999, page 69):

I have an observation that might be useful to organizations proclaiming to be victims of the IT "shortage."

How many sharp people are there in your organization who would make outstanding IT staff — if

Send letters to nwnews@nw.com or John Dix, editor in chief, Network World, 161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.

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MORE ONLINE

Letters about ASP security and other topics.

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Mike Keefe



they had training and guided experience? For that matter, how many experienced IT staffers do you presently have who have outdated skills? Why not train both of these groups to help them acquire current skill sets? Problem is, the companies don't want to train current staff. It's easier and cheaper to hire fresh staff and burn them out.

In my experience, most organizations say they invest in their workers but won't do it. They would rather hire a fresh college graduate for peanuts than provide decent training opportunities for their current IT staffers. Some of the companies say, "If we train them and give them hot and current skills, then they will leave us and go somewhere else to make more money."

Pay your people what the market is offering, and they won't leave. Treat them like decent human beings, give them training in desirable IT skills and interesting work to do, and they won't want to leave. But deny them training, give them mind-numbing projects and pay them well below market salaries, and watch them run.

There is no shortage of IT professionals. There is an abundance of companies that refuse to intelligently use the talented staff that they do have.

Richard Kissel
Computer specialist
Ijamsville, Md.

SECURITY AND ASPs

Winn Schwartau's opinion column "Security and ASPs: Out of sight, not out of mind" (NW, Dec. 13, 1999, page 55) was a great article and starting point for a very important conversation. In addition to what Schwartau articulated, securing the environment should also include regular vulnerability assessments of the hosting servers and the implementation of real-time intrusion detection, both host- and network-based, for the entire environment. By adding these to the list you can now implement the security necessary to adequately harden an ASP environment.

Erich Baumgartner
Vice President — Channel Operations
Axent Technologies
Rockville, Md.

Totally Unplugged . Ira Brodsky

DEBUNKING THE MYTH OF EUROPE'S WIRELESS SUPREMACY

You hear them more and more: complaints that the U.S. trails Europe in wireless technology. Well, that may have been true three years ago. Now things are changing, and Europe — thanks to the same protectionist policies that helped it grab the lead — is falling hopelessly behind.

According to some pundits, Europe's wireless market is more advanced because European governments had the wisdom to choose and enforce a single digital wireless technology standard. This view was echoed in a *Time* magazine article entitled "Why your cell phone stinks" (Aug. 23, 1999). The article suggested that competing technology standards in the U.S. have resulted in an expensive but pointless marketing war, spreading confusion among consumers.

The undeniable success of Europe's Global System for Mobile communications (GSM) standard may indeed seem like a compelling argument for government-mandated standards. But GSM succeeded for three other reasons: It introduced much-needed competition among European mobile telephone operators; hastened the transition to digital technology; and enabled continentwide roaming. These benefits could

have been achieved just as easily with competing technology standards.

Resisting the temptation to impose a single standard, the U.S. now has three: GSM; Time Division Multiple Access, based on the same underlying technology as GSM; and Code Division Multiple Access (CDMA), a radically different technology invented by San Diego-based Qualcomm.

The U.S. market was slow to adopt digital wireless technology because the free market only abandons old technology when new technology demonstrates significant price/performance improvements. Led by CDMA, digital wireless technologies are now delivering greater capacity, better audio quality, longer battery life and new data services — and the U.S. wireless market is converting to digital at breakneck speed.

Artificially insulated from competition, Europe's GSM industry reacted predictably. When CDMA was being developed, they said it wouldn't work. When CDMA service was introduced, they said it was too



little, too late. Now that CDMA has acquired 50 million users in record time, the GSM industry claims to have invented it, despite the fact that there are no CDMA mobile telephone networks operating in Europe. Meanwhile, CDMA is spreading like wildfire across North and South America and Asia.

CDMA has proved superior for voice but has even greater advantages for data. While most GSM operators offer short messaging and circuit-switched data at 9.6K bit/sec, Sprint PCS has rolled out Wireless Web service (handsets with microbrowsers) and circuit-switched data at 14.4K bit/sec. Korea has launched 64K bit/sec CDMA data service, and Japan is doing the same. Even Europe's GSM industry agrees CDMA is the best way to achieve higher speeds. They should know: their networks are running out of capacity.

Brodsky is president of Datacomm Research Co. in Chesterfield, Mo. He can be reached at ibrodsky@datacommresearch.com.

Reality Check . Thomas Nolle

A NEW VISION OF THE NETWORK OF THE FUTURE

Federal regulators have paved the way for the incumbent local exchange carriers to provide what the telecom act calls "advanced services," meaning high-speed digital access. The scope of the advanced-services infrastructure is enormous, encompassing the entire regional Bell operating company network. The impact on users could be enormous as well.

The new broadband access networks differ from the current networks in that they will involve smart, fiber-based remote devices that operate between the user premises and the carrier central office. These devices will be capable of supporting multiple service relationships per customer — voice calls, data services, Internet and so on. In short, the network of the future will perform service-specific routing of connections. Thus, we can expect that a future network will support Internet access not via dial-up over the public switched telephone network, but by simply setting up another service connection from the customer to the point where the Internet service is offered.

This point could be called the service point of presence (SPOP). Like a long-distance carrier's point of presence, the SPOP is where the user and the service really link up. The access network acts only as a conduit to get the right information to the SPOP. At the SPOP, service features can be added by interpreting the user's incoming data flow and responding. By building a network of SPOPs you can create national

and international services, each supporting its own user community via local access connections.

The impact of the SPOP on the networking market will be profound. For example, consider the so-called Internet offload problem. This occurs because with today's dial-up ISPs, we use a voice service to make an Internet access connection. In the network of the future, the Internet flow from customer to ISP will never touch a voice device, so there will be no Internet traffic to offload.

The SPOP's biggest impact, however, will be on the concept of convergence. Dense wave division multiplexing (DWDM) transport already promises to lower the cost of long-haul bits. If we imagine any service network as a network of SPOPs, it's clear that those networks can use any form of protocol they find convenient. Voice traffic can continue to use time-division multiplexing, and IP packets can be transported as IP packets.

Even at the device level, service grooming in the access network changes the whole picture. Vendors once visualized next-generation voice products as having voice-data features to handle the users' demand for multiple services. With each service flow separated at the point of customer connection and directed to its own service-supporting destination device, why should we care about integrated features in a device?

SBC Communications' Project Pronto, which promises an ATM-based access network for all SBC customers (eventually), shows how the SPOP concept works in its support for traditional voice services. Class 5 switches from Lucent or Nortel Networks, attached to the ATM access network, will receive cells created from the analog dial sequences and voices of

the users. These switches will generate their own cells representing the call progress signals and voices of the other parties on the call. The existing Class 5 switches will be voice SPOPs. ISPs such as SBC's partner Prodigy will provide Internet SPOPs.

What will SPOPs look like? Chances are there will be as much diversity in SPOP architecture as in long-haul transport protocols. The only common element in SPOP architecture is the need to support the RBOC or other access networks — meaning ATM and cable or packet interfaces.

SPOP devices also may offer better Multi-protocol Label Switching support than traditional network hardware because MPLS is a convenient way to bridge ATM, packet and optical technology with a single protocol.

For users, the SPOP architecture means that the focus of convergence will fall on the access device, an area that has been neglected in favor of faster and more glamorous core technologies, such as terabit routers or DWDM switches. It also means that a user will have an access provider that offers the last-mile infrastructure and a series of service providers whose SPOPs create the voice/data service mix the user consumes.

As all of this unfolds, it will affect everything from network management to business planning. Monitor the progress of your access carriers and access equipment vendors to be certain they're not caught unaware as these changes develop.

Nolle is president of CMI Corp., a technology assessment firm in Voorhees, N.J. He can be reached at (856) 753-0004 or tnolle@cimicorp.com.





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Picks of the Week

Government Internet regulation: Yea or nay?

Wednesday, Jan. 26, 1 p.m. to 2:15 p.m.

One of the most pressing questions facing American government, the legal community, the IT community and the country at large is whether the government should regulate the Internet, and if so, in what ways and to what extent.

Join moderator and former Federal Communications Commission Chairman Richard Wiley, a co-founder of ComNet and now a senior partner at Wiley, Rein & Fielding, for what is sure to be a heated debate on topics related to government regulation of the Internet.

This debate features panelists on both sides of the regulation fence, including Frank Dzubeck, president and CEO of Communications Network Architects, and Dennis Kneale, executive editor of *Forbes*.



Frank
Dzubeck

Convergence or Internet commerce: Which will drive enterprise network strategy in the new millennium?

Wednesday, Jan. 26, 4:45 p.m. to 6 p.m.

Major companies are reinventing themselves, their business processes and operations around e-commerce. Their plan to use IP-based networks for the enterprise is food for thought.

This debate, moderated by Frank Gens, senior vice president at International Data Corp., will touch on some of the pressing issues related to IP-based networks.

Panelists will include Berge Ayvazian, executive vice president of The Yankee Group, and Diane Herr, product marketing vice president at Lucent.

Highlights

Monday, Jan. 24

One-day tutorials:

9 a.m. to 4 p.m.

FUNDAMENTALS OF NETWORK SECURITY

Few networks today fail to extend beyond the walls of the company. Many are connected to the Internet, and how to protect what's on those networks has become one of the biggest concerns of IT and network professionals.

This tutorial will provide the fundamentals needed to understand how network security works and what elements provide for it. Key issues to be discussed include basic threats and attacks at the virtual and physical levels.

Panelists: Satish Chandra, manager for network technology at Mitretek Systems, and Darren Cuffie, principal engineer in the telecommunication and networking division at Mitretek Systems.

9 a.m. to 4 p.m.

PLANNING FOR WINDOWS 2000

Windows 2000 implementations may be down the road a ways, but the time to think about them isn't. IT managers interested in deploying Win 2000 will need to address a complex set of new features such as Active Directory and IntelliMirror to realize the benefits. This tutorial is aimed at helping net professionals devise a strategy for moving to Win 2000. Morgan Stern, author and consultant at International Network Services, chairs this session.

Two-day tutorial:

9 a.m. to 4 p.m., Monday, Jan. 24

10 a.m. to 4:30 p.m., Tuesday, Jan. 25

ADVANCED NETWORK SECURITY

Worried that your company is next on the hacker attack list? In today's e-networked

world, companies must know how to secure nets that are connected to the Internet. This two-day tutorial covers a variety of related topics, including advanced firewall design, configuration, testing and virtual private network services. Also of note is a look at why the perimeter security model associated with firewalls fails in most real-world applications. And yes, there is time for questions and answers. Bart Stidham, enterprise architect for the AG Group, leads the session.

Tuesday, Jan. 25

One-day tutorials

10 a.m. to 4:30 p.m.

LINUX — A NEW CHOICE IN NETWORK SERVERS

Linux is the hottest new server operating system to hit the network in recent years, with companies such as Intel, Compaq and IBM investing in it. With end users rallying around this open source operating system, this year might be a good time to see why. The tutorial provides a demonstration of Linux's capabilities and shows where Linux fits on your network, how to install and configure the services your users need, and what type of skills are needed to install and maintain a Linux server. Author Craig Hunt leads the session.

10:30 a.m. to noon

THE FIBER OPTICS LAN SECTION

Everything you wanted to know about fiber optics but were afraid to ask. Join the Fiber Optics LAN Section of the Telecommunications Industry Association to learn what's happening in the optical fiber arena.

The seminar will cover new products, the evolution of standards, topologies and technological advancements. Then hang around for the 1:30 p.m. to 3 p.m. session:

Highlights cont'd.

The Optical Interface Forum, Revolutionizing the Optical Network. In this session, experts will discuss trends in optical networking and tell you how they will affect your net.

Wednesday, Jan. 26

2 p.m. to 3:30 p.m.

DISCUSSION OF EMERGING NETWORK SOLUTIONS AND FUTURE TRENDS

This session will feature senior industry observers' predictions of how emerging technologies will mature. The session will examine the Internet, virtual private networks, voice over everything, multimedia, quality of service and other topics in a world of exploding bandwidth — dense wave division multiplexing, fiber to the home, SONET rings to the office and more.

The speakers have very different backgrounds, ensuring a lively session. Tom Hadley, senior networking consultant at IBM, leads the session, which includes Laura Knapp, a networking consultant at IBM; Atul Kapoor, managing director of The Tolly Group; and John Walker of Ganymede Software.

3:45 p.m. to 5:15 p.m.

NETWORK AND APPLICATION OUTSOURCING CONSIDERATIONS

When is a good time to take network tasks to an outside provider? Weighing the benefits, drawbacks and costs of network outsourcing is paramount to determining what many network managers will face as they try to meet increasing pressures to reduce costs, become more competitive and innovative, get closer to the customer, and keep informed about new technologies. This session covers some of the ups and downs of outsourcing and helps identify when it should, and should not, be used. Speakers include Michael Mael, vice president of applications and services at PSINet; George Khater, director of product management at NaviSite; and Mark O'Leary, director of technical marketing at AT&T.

Thursday, Jan. 27

10 a.m. to 11:15 a.m.

NETWORK ANALYSIS AND PROBLEM SOLVING: STOP POINTING THE FINGER

Having the right tools and knowing how to use them always helps get the job done faster, easier and often for less money. Approaching

network services this way using good management strategies and collaborative tool sets is the concept behind this session. Ken Rehbehn, manager of product strategy and the advanced planning group at Visual Networks, leads the session.

10 a.m. to 11:30 a.m.

UNDERSTANDING THE APPLICATION SERVICE PROVIDER INDUSTRY

Loving the Internet and what it can do for your business? But not loving the idea of hiring a dedicated staff and spending the money needed to maintain a facility that probably includes a fire-suppression system, 24-7 backup power and flood protection? You're not alone, and that's why the application service provider (ASP) market is booming. This session features ASPs and ASP infrastructure vendors that will discuss the key capabilities the providers must supply in order to successfully deliver application services that meet stringent customer requirements. Participating in this session will be Aaron Goldberg of ZD Market Intelligence; Dave Yewell, vice president of strategic partnerships at Wyse Technology; Paula Hunter, director of solutions marketing and operations/emerging markets and programs at Compaq; and Chad Corneil, product manager at Great Plains Software.



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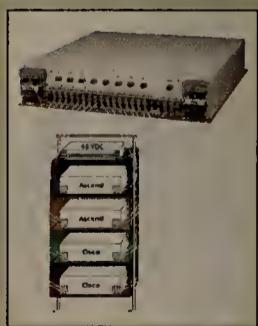


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Must See

Network Operating System Extravaganza

Network World's Network Operating System Showdown

Wednesday, Jan. 26, 1 p.m. to 2:15 p.m.

Leave the marketing presentations behind for this important session. With the plethora of operating system platforms available for business and no shortage of hype behind each one, knowing what package to pick for the job of building your network is no simple task.

Join moderator and *Network World* Editorial Director John Gallant, top operating system vendor executives and industry experts for a debate on everything from operating systems' performance, scalability and cost of ownership, to directory services and management tools.

NOS Showdown Lab

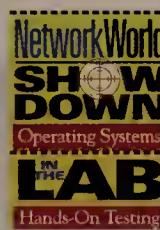
Main lobby of the Washington, D.C. convention center

Tuesday, Jan. 25 through Thursday, Jan. 27

Network World and Test Alliance partner Centennial Networking Labs of North Carolina State University are offering a hands-on comparative look at Microsoft's Windows 2000, Novell NetWare 5.1, Red

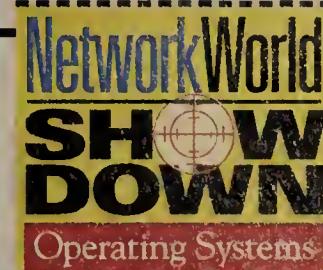
Panelists:

- Tom Keith, director of Unix market development, IBM.
- Aubrey Edwards, group product manager, Microsoft.
- Kim Clark, director of the core operating system platform group, Novell.
- Erik Troan, director of engineering, Red Hat Software.
- Tamar Newberger, director of product marketing for server products, The Santa Cruz Operation.



Hat Linux 6.1 and The Santa Cruz Operation's UnixWare 7.1.1 to all ComNet trade show attendees in its NOS Showdown Lab.

The lab will run continuously during show hours. Attendees will get a hands-on, customizable view of how these network operating systems stack up against each other. Attendees can also pick the brains of the engineers from Centennial Networking Labs who will be conducting this first-ever public showdown between the brand-new Win 2000 and its competitors.



Panel of experts:

Dave Kearns, noted technology writer and author of *Network World's* popular "Wired Windows" column.

John Fontana, a top *Network World* senior editor.

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The ABCs of PKI

Decrpyting the complex task of setting up a public-key infrastructure.

BY BARTON MCKINLEY

The concept of a public-key infrastructure is relatively straightforward, but actually setting up a PKI in your network can be a complex and daunting undertaking.

The basic idea is that sensitive data is protected through encryption. Each end-user device has encryption software and two keys: a public key for distribution to other users, and a private key, which is kept and protected by the owner.

A user encrypts a message using the recipient's public key. When the message is received, the user will decrypt it with his private key. Users may have multiple key pairs to maintain discrete communications with different groups.

With all these key pairs floating around, it's crucial to have some method of administering the keys and their usage. That's where a PKI comes in, enabling the centralized creation, distribution, tracking and revocation of keys.

It all starts with authentication

The first step in setting up a PKI is establishing a system for authentication, so users can be positively identified before receiving network rights.

Password-based logons provide one method of authentication, but a more secure method is digital certificates. Each certificate contains specific identifying information about a user, including his name, public key and a unique digital signature, which binds the user to the certificate.

To get a certificate, a user sends a request to a designated registration authority, which verifies the user's identity and tells the certificate authority to issue the certificate.

The certificate itself is a digital document, which is generally stored and administered in a central directory. For a user operating from home, the certificate would be stored on his system. In either case, the certificate is transmitted automatically when needed, and the user's work is not interrupted.

The certificate authority verifies a certificate's

authenticity for the receiver. Again, for the user, this is generally transparent.

Of course, certificates should not last forever. Each certificate is issued with an expiration date and sometimes will need to be revoked early, such as when an employee quits. A certificate authority can revoke a certificate before its expiration date by identifying it in a regularly published certificate revocation list.

As with key pairs, there is a need to coordinate the issuing and revoking of certificates. That is another function of a PKI, acting as a comprehensive architecture encompassing key management, the registration authority, certificate authority and various administrative tool sets.

PKI software comes in different flavors depending on who you buy it from: Entrust Technologies, Baltimore Technologies, RSA Security and VeriSign all offer PKI products. In each case, some form of certificate authority and registration authority, key and certificate management, and key backup and recovery tools will be required.

PKI requires a central directory

Generally, a central directory is also implemented as part of a PKI, as a place to store and look up certificates, along with other relevant information. You may already have a directory for the support of existing applications, such as e-mail. If the existing directory is Lightweight Directory Access Protocol- or X.500-compliant, it is probably usable by PKI requirements.

However, directory systems do not always interoperate well and can frustrate your PKI efforts, especially if the directory is expected to handle diverse client applications in addition to a PKI. Lack of directory interoperability has prompted vendors to create the Directory Interoperability Forum to try and resolve the issue.

Another element of a PKI is the certificate policy, which outlines rules for the use of a PKI and certificate services. For example, if a user mistakenly shares his private key, he might be expected to notify security staff or the certificate authority.

Proactive determination of how that event would be handled is critical to the operation of a PKI and is addressed by a certificate practice statement (CPS).

Getting a certificate

To get a digital certificate, the end user must satisfy the registration authority and certification authority.

- 1 User asks the registration authority for a digital certificate.
- 2 The registration authority verifies the user's identity and asks the certificate authority to issue a certificate.
- 3 The certificate authority stores the certificate in the directory and copies the user when it's needed.



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The certificate policy and CPS are generally written in consultation among IT, various user groups and legal staff.

The CPS provides a detailed explanation of how the certificate authority manages the certificates it issues, along with associated services, such as key management. The CPS also acts as a contract between the certificate authority and users, describing the obligations and legal limitations, and setting the foundation for future audits. PKI vendors can provide you with a CPS template to work with.

As with any other IT infrastructure, a staff is needed to set up, administer, fix and manage a PKI. Finding those people is essential but may prove difficult, as demand for competent PKI support will likely outstrip supply in the coming year.

As a start, you will need to appoint a security officer, who will be responsible for setting and administering your shop's security policy. This individual does not need to be part of IT, but must understand the issues and will probably need a surety bond.

Next, appoint a PKI architect who will examine requirements and design your PKI. This person may also support implementation as project manager.

A PKI security administrator, who will use certificate authority management tools to add, enable and revoke users and their certificates, is essential for ongoing operations.

You will also need a directory administrator and someone to act as a registration authority, although it is possible to set up an automated registration authority to handle user requests made through

PKI IMPLEMENTATION WORK PLAN

So you have decided to go ahead and set up a PKI, now what? There are several stages to the process.

- Assemble a team. Put together a team that includes representation from the user community.
- Assess the current environment. Determine what you already have in-house that could be useful in setting up the PKI: staff, a directory and hardware are all considerations at this stage.
- Determine the requirements. Clarify strategic requirements, business and technical, for the PKI. All affected parties need to be consulted and their respective PKI-related needs made clear.
- Review and compare options. Learn about different PKI models and consider the various vendor options.
- Develop a plan. Based on what you know so far, build a project plan and allow for all necessary resources. Now revise the plan and buffer it by at least 50% for unforeseen costs and scheduling delays.
- Design the PKI architecture. Design a general architecture for the PKI, including consideration for backup systems and any links to external clients.
- Evaluate, test and select. Write up a set of evaluation criteria for use in the initial review of products and services. Next, write a set of test criteria and trial products in-house.
- Pilot and communications. At this stage, you will install the selected product and run a pilot PKI to be certain that what you have chosen addresses your PKI requirements. Explain the new PKI services and associated benefits to users. Provide technical training to support staff.
- Implementation, test and roll out. You are now ready to scale your PKI from the pilot to a full implementation. Rolling out the PKI in managed stages is recommended.

their Web browsers. In that case, you may be able to use current staff, such as a database administrator, to help set up and maintain the automated registration authority service.

Do you need a PKI?

Clearly, putting a PKI into place will take considerable effort, time and money. So is it worth the investment? Maybe. The real question you need to consider is, "What are our business requirements for increased security, and can a PKI help address them?"

Most of your users won't have an opinion, for now, but management might — especially if it is concerned about the impact a security breach could have on the bottom line. Getting management to buy into the idea of a PKI is crucial, so you will need to learn their thoughts early in the process.

Some services stand out as immediate candidates for PKI support: e-mail, secure file transfer, document management services, remote access, e-commerce and Web-based transaction services. Support for nonrepudiation, which ensures that transactions cannot be disowned, is also required and supplied through the use of digital signatures.

Then there are wireless networks and virtual private networks, in which encryption is pretty much essential as a guarantee of confidentiality.

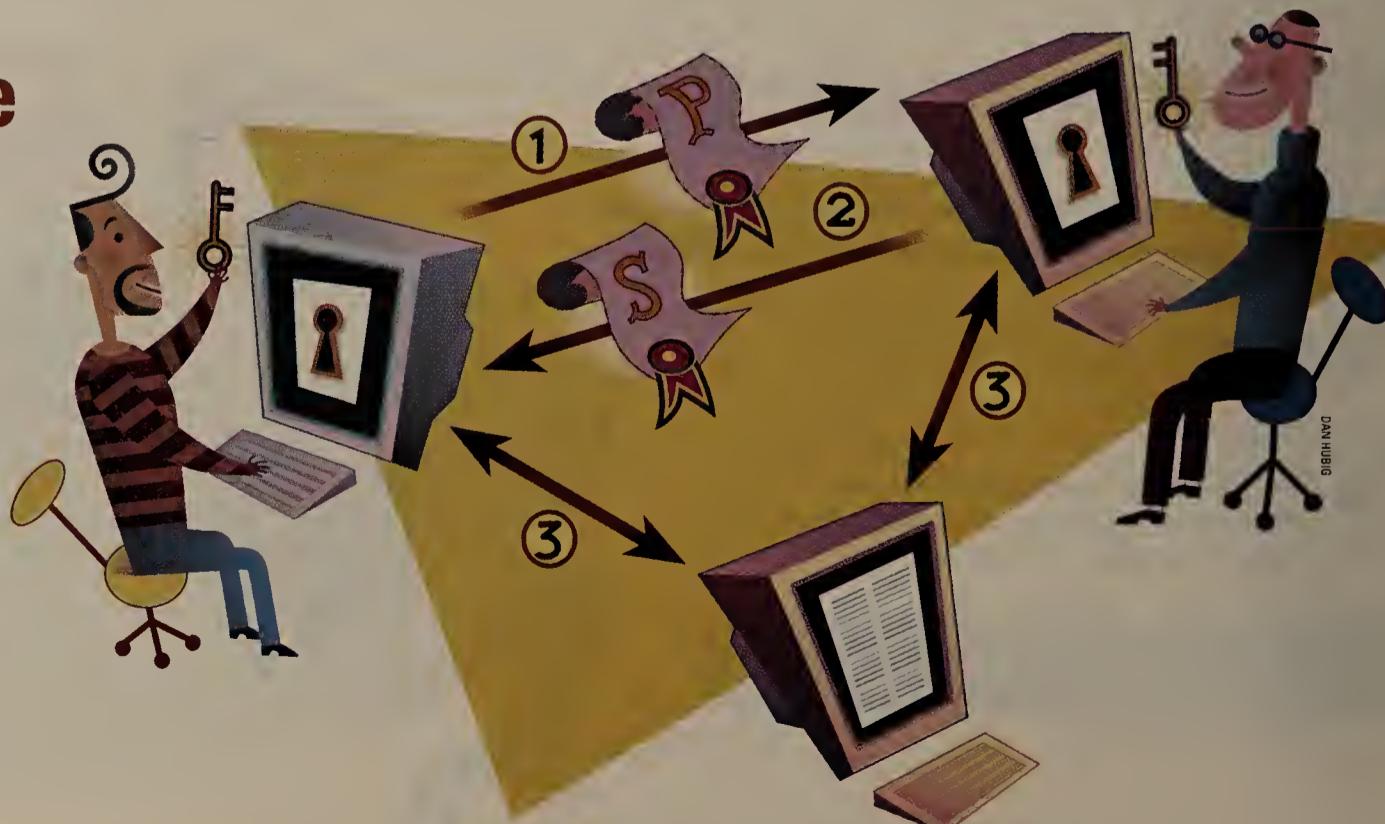
For the corporate network and e-commerce, another PKI-enabled solution that should be of real benefit is single point sign-on.

McKinley is president of Summit Communications, an IT consultancy based in Ottawa. He can be reached at barton@summit-com.com.

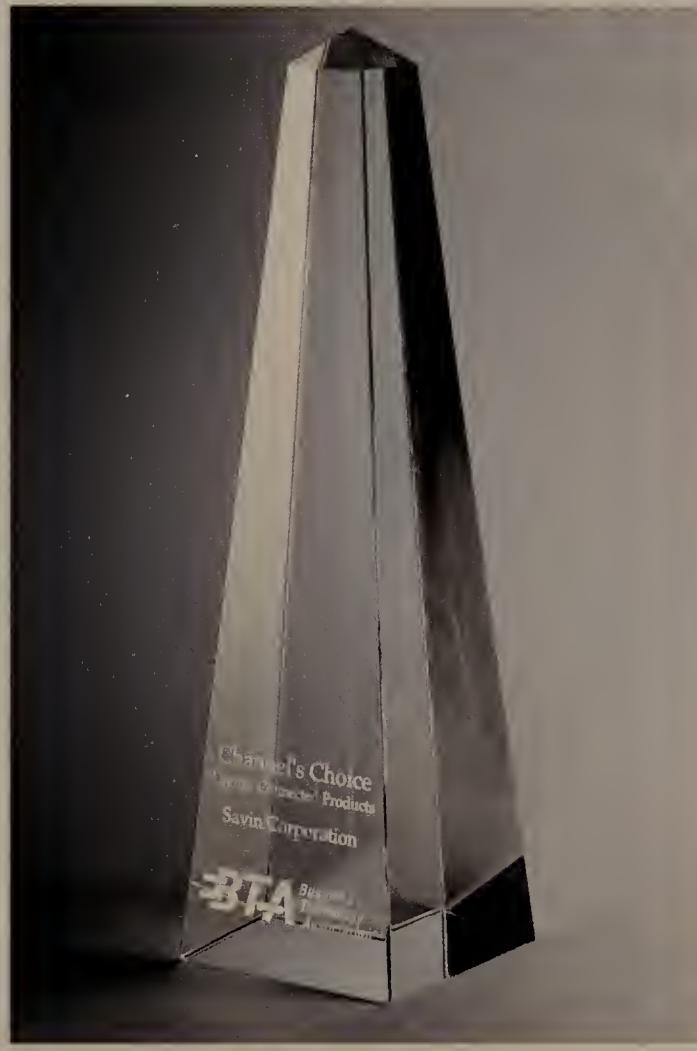
Using a certificate

A digital certificate can give an end user access to a secure server.

- 1 User accesses a secure server, providing a personal certificate.
- 2 Server provides user with a server certificate.
- 3 User and server validate received certificates, by lookup in a directory. Once authentication is completed, the user is allowed access.



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CAN ETHERNET SPAN LAN, MAN AND WAN?

IEEE's 10-Gigabit Ethernet task force is preparing Ethernet for the long haul.

BY JEFF CARUSO

Remember the initial hype surrounding ATM? Its proponents dreamed of a world dominated by ATM, the only technology able to stretch across both the LAN and the WAN, creating a single, unifying network delivering voice, video and data over the same wire to desktops everywhere.

Now, rightly or wrongly, some people are dreaming the same dream about Ethernet.

Ethernet, of course, dominates the LAN. It has scored a knockout win over token ring. And it has mounted a successful counterattack against ATM's advances. First, ATM to the desktop lost favor because Ethernet and Fast Ethernet were already well-entrenched in desktop connections. Then, ATM started losing ground in campus backbones, as Gigabit Ethernet and Layer 3 switching came to the fore. Now, Gigabit Ethernet is being used in some metropolitan-area networks (MAN), and standards bodies are readying 10-Gigabit Ethernet for metropolitan and even WANs.

Can Ethernet really pull it off? Can Ethernet make inroads in ATM's WAN turf? Can any technology really be all things to all people?

To be sure, Ethernet has some serious competitors in both MANs and WANs. ATM, for one, remains a potent force. Then there's a technology proposed by several Swedish companies, called Dynamic synchronous Transfer Mode (DTM). A third competitor is a technology developed by Cisco, called Dynamic Packet Transport (DPT).

But the most well-placed competitor is Packet over SONET, says Joe Skorupa, director of switching and routing at Ryan Hankin Kent, a market research firm in South San Francisco. "There's an awful lot of SONET out there, and it's not going away," he says.

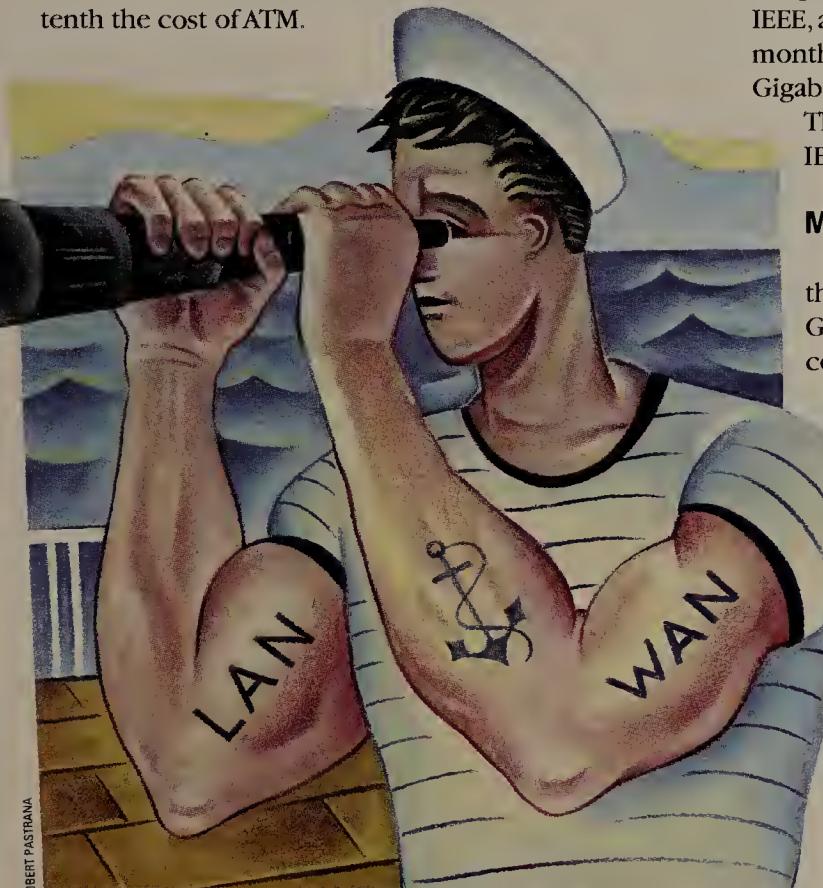
What Packet over SONET has going for it are built-in management capabilities, which are essential for transporting data over very long distances. If something breaks down along the way, there has to be some way of letting the network's managers know. Ethernet never had to worry about those distances, so it doesn't have those capabilities.

"Over long-haul links, I still have concerns about Ethernet's robustness," Skorupa says.

One possible solution is to create a kind of "digital

wrapper" around Ethernet frames for long-haul traffic, a wrapper that would have management data akin to SONET. But adding the wrapper might add complexity and expense, which defeats the purpose of using Ethernet technology in the first place.

Much of Ethernet's success has been based on its low cost and simplicity. Equipment vendors are saying Ethernet in the wide area may have as little as one-fifth the cost of SONET and one-tenth the cost of ATM.



Such numbers are attracting carriers, such as MCI WorldCom (NW, Aug. 16, 1999, page 1). The company is looking into Ethernet over long distances, but has reservations about the technology's performance in the WAN, says Rama Nune, senior manager for optical and data networks at MCI WorldCom.

10-Gigabit Ethernet

But there is enough interest that vendors have been trying to make the next Ethernet standard in the works, 10-Gigabit Ethernet, ready for the WAN.

A debate raged last year in the high-speed study group of the Institute of Electrical and Electronics Engineers (IEEE), over which speed to choose for 10-

Gigabit Ethernet. The reason was that 10G bit/sec makes sense in the LAN, but 9.584640G bit/sec is the payload rate of OC-192 SONET used in the WAN.

The group compromised in September. It decided to specify the media access control (MAC) layer of the new standard at 10G bit/sec, but it will also allow vendors to add logic to the physical layer to convert the traffic to SONET rates. That is, the physical layer will clock traffic into the LAN at 10G bit/sec, but it will clock it out into the WAN at 9.584640G bit/sec.

Because the logic would be fairly simple, adding it shouldn't have much impact on the cost of Ethernet in the WAN, says Bob Grow, an engineering fellow at Intel involved with the standards work.

The next step for the emerging standard is to get the project authorization request approved in the IEEE, and Grow says that's on track for later this month. After that, the first meeting of the official 10-Gigabit Ethernet task force will happen in March.

The work is expected to receive the designation IEEE 802.3ae.

Much to be done

Putting Ethernet into the WAN isn't trivial, and the task force will have its work cut out for it, Grow says. IEEE members like Grow, who have come from a LAN background, will have a lot to learn about how to transmit data over very long distances, he says. Likewise, members who have come from a WAN background will have to learn the intricacies of the LAN technology.

Right now, the idea is that the technology would work over several hops. Here's a typical scenario. LAN traffic would be aggregated through a campus backbone switch, putting 10G bit/sec onto a long-distance fiber-optic line. The line should be able to reach about 40 kilometers, in the same range as long-haul Gigabit Ethernet today in MANs.

The fiber-optic line would go to a telco central office, where there would be a telco repeater. The repeater is used for long-distance data hauling and shouldn't be confused with a LAN-based "repeater" in the Ethernet world, also known as a hub. The telco repeater would either map the signal onto a SONET frame or simply transmit the data on a wavelength in a dense wave-division multiplexing environment, Grow says.

Gigabit Ethernet is already a player in MANs, but whether it can parlay success in that area into success in the WAN is still to be determined. Industry watchers are now saying Ethernet technology will be one option for carriers in the WAN, but not the only one. Plus, it's not likely to be the dominant one.

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Good things still come in small packages. Compaq's ProLiant 6400 is an enterprise server in a rack-mount form factor. It earned a 9.3 score in our testing, with the best combination of performance and features of any enterprise class server we have tested so far. The 6400 isn't the best-performing server we've tested in all performance categories, but its high-performance RAID controller and small form factor make it an attractive offering.

The 6400 earned a respectable 8.4 score for overall performance. Its SQL database test score is the best we've seen among all the servers we've reviewed, probably due to the server's four 500-MHz processors with 2M bytes of L2 cache and 2G bytes of system RAM.

But the file serving score of 7.5 was merely good. That's surprising considering the inclusion of Compaq's new Smart Array 4200 RAID controller, a four-channel Ultra2 SCSI 64-bit PCI adapter with a Reduced Instruction Set Computing-based architecture. The controller cache was large at 64M bytes, but the one server we tested that had better file test scores, Dell's PowerEdge 6350, had a 128M-byte disk controller cache, which may explain the performance difference.

The network score of 7.7 was only good. The 6400 has two dual-port Fast Ethernet network interface cards (NIC). It seems that Compaq failed to optimally tune the Novell NIC driver as well as the NT driver,

ScoreCard



Compaq ProLiant 6400



Performance (40%)	8.4
Features and flexibility (30%)	10
Manageability (20%)	10
Serviceability (10%)	9
Total score	9.3

Individual category scores are based on a scale of 1 to 10. Percentages are the weight given each category in determining the total score. The World Class Award goes to products that earn 9.0 or above on the Scorecard.

resulting in lower scores.

The server itself takes up just four rack spaces. It sports two hot-swappable fans on the front and a four-slot 1-inch single connector attachment hot-swappable drive bay. The CD-ROM drive is a thinner laptop-type drive to conserve space.

Along with the server came a Compaq StorageWorks Enclosure

Big little server

Compaq's ProLiant 6400 packs great features, good performance in a rack-mount enclosure.

BY JOHN BASS,

NETWORK WORLD TEST ALLIANCE

Model 4214 external disk array. The 4214 is an impressive box that takes up three spaces in a 19-inch rack. It includes 14 1-inch hot-swap slots, and our unit came fully loaded with 14 9.1G-byte 10K-rpm Ultra2 SCSI drives. All the drives were configured on one RAID 0 string.

Those 127G bytes of storage were controlled by the Smart Array 4200 RAID controller, a new offering from Compaq. The 4200 supports 64M bytes of battery-backed cache; the batteries and cache are on a removable daughterboard. The battery can maintain the cache for as long as four days, allowing you to move the battery and cache daughterboard to a new 4200 array controller in the event of a failure. The 4200 has four external and two internal SCSI connectors for flexible connections to drive arrays, and supports online RAID-level migration, online capacity expansion, online drive spare, automatic array rebuilding and hard disk error scanning.

The ProLiant 6400 has a good list of availability features. The dual load-balancing hot-swappable power supplies provide redundancy in case one of the power supplies fails. The hot-pluggable drive slots, along with the availability features of the 4200 RAID controller, provide redundancy and a short repair time if there is a failure in the disk subsystem. The two redundant system fans can be hot-swapped in the event that one or both fails.

The 6400 scored a 10 for features, thanks to its 64-bit hot-swap-ready PCI slots, 4200 RAID controller features and large number of drive slots.

Compaq has done a good job with manageability. Compaq Insight Manager, Insight Manager XE and

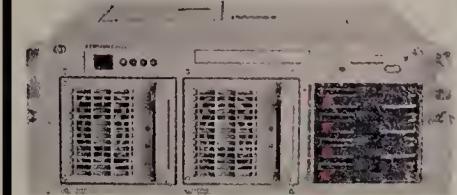
the optional Remote Insight Board give you a lot of tools to remotely and locally manage the 6400 from the Web, with SNMP or with Desktop Management Interface (DMI).

Compaq Insight Manager monitors the hardware components and reports monitored values to many popular management platforms. Insight Manager XE, which began shipping in July, includes a set of agents to be loaded on the server

Compaq ProLiant 6400



Compaq's ProLiant 6400 is a World Class server with outstanding performance as an application server and a host of useful features.



so that it can be managed using SNMP, DMI or HTTP. The agent includes a small Web server that lets you access server management functions from a browser anywhere on the Web, as well as its own console application for local or remote management over the Web.

For remote management, the server comes with an Integrated Remote Console which, in combination with a modem, gives you remote access to the server. Compaq also offers an optional Remote Insight Board, which includes a modem for monitoring the server remotely. The Remote Insight Board stays up even if the server fails.

Feature and configuration table

Server	ProLiant 6400
Vendor	Compaq
Price as tested	Server: \$39,088; 4214 disk array: \$9,382; Total: \$48,470
Processor type	500MHz Pentium III Xeon
Number of processors	4
Number of processors supported	4
Memory configuration	2G bytes — (16) 128M byte DIMMs
Number and type of RAM slots	16 EDO
Expansion slots present	5 64 bit 33MHz PCI, 1 PCI/ISA (64 bit 33MHz PCI)
Expansion slots available	2 PCI, 1 PCI/ISA
Disk controller	Compaq 4200 Array Controller, integrated two channel UltraWide controller
Hard drive description	(15) 9G bytes 10K RPM Ultra2 SCSI drives
Number and description of hard drive bays	(14) 1 inch hot plug slots in external Compaq 4212 RAID Array Controller; (4) 1 inch SCA hot plug slots in internal drive bay
Network interface	(2) Intel dual port 64b PCI NIC
CD-ROM	24X IDE
Availability features	PCI hot plug ready slots, hot plug drives, redundant hot plug fans, ECC memory, (2) load balancing failover hot plug power supplies
Manageability features	Compaq Insight Manager, Integrated Remote Console
Service features	Toolless entry with toolless internal design with thumb screws, release levers and PCI latches
Security features	Power on password, keyboard password, diskette control, boot control, bezel lock
Bundled software	Compaq Smart Start, Array Configuration Utility, Compaq Insight Manager
Warranty	Three year next business day on parts and labor

Service features were great in the 6400, too. The case provides good accessibility to all the internal components. The internals are arranged in a modular fashion, and each of the modular components is easy to

replace. The internal components can all be removed and replaced without tools, but entry into the case requires Torx or small slotted screwdrivers.

The 6400, along with the Compaq

SmartArray 4200 and 4214 array enclosure, packs a lot of power and flexibility into a small package. The unit is rich in management features and easy to service. All in all, the 6400 is a good performer in a great package.

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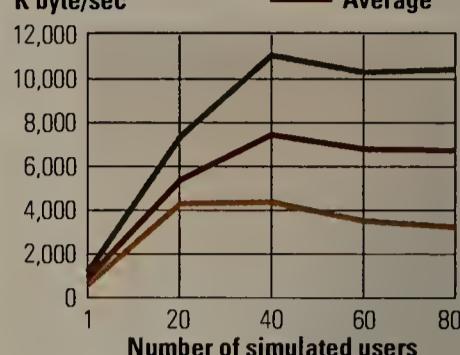
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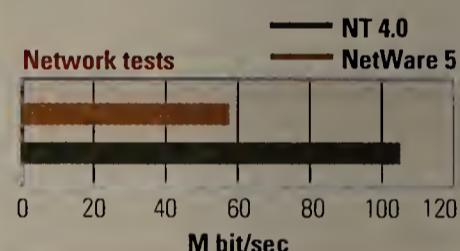
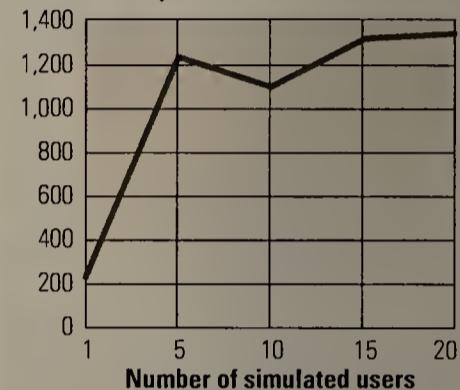
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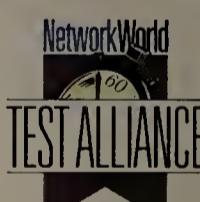
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BENCHMARKS

See how we test servers.



Server testing is performed at North Carolina State University's Centennial Networking



Labs (CNL) in Raleigh, N.C. CNL tests networking equipment and network-attached devices for interoperability and performance. John Bass, technical director for CNL, designs and leads the execution of the test suites. He can be reached at john_bass@ncsu.edu.

Bass is also a member of the Network World Test Alliance, a cooperative of the premier reviewers in the network industry. For more Test Alliance information, including what it takes to become a member, go to www.nwfusion.com/alliance.

Ever stare straight into the face of an enterprise rollout of hundreds of NT workstations? It's ugly. If just one typical NT workstation build takes four to six hours, an entire deployment is equivalent to a short jail sentence.

Luckily, there are software packages that give you a "Get Out of Jail Free" card. We looked at two disk-imaging tools that go a long way in helping administrators roll out multiple desktop machines.

You won't find vast differences between Symantec's Norton Ghost 6.0 Enterprise Edition and PowerQuest's Drive Image Pro 3.0 clients. They use the same method to clone disk drives. Their performances are similar. And they support the same operating systems. But we gave our Blue Ribbon Award to Norton Ghost because its centralized management console is an advantage in an enterprise environment.

We found the ancillary utilities

ScoreCard



	Norton Ghost 6.0	Drive Image Pro 3.0
Administration 35%	8	7
Flexibility 20%	8	7
Client support 15%	8	8
Reporting 10%	6	5
Performance 10%	8	9
Documentation 5%	9	8
Installation 5%	4	3
Total score	7.65	7.00

Individual category scores are based on a scale of 1 to 10. Percentages are the weight given each category in determining the total score.

bundled with each program to be the biggest differences.

Norton Ghost Console lets you select a machine by media access control address or computer name from a central console and clone it over the network. This capability requires Ghost client software on the remote PC, which is installed using a boot disk and a script. Using the Ghost Console, you can remotely change settings such as PC name, computer description and domain affiliation — a must-have feature in an enterprise environment. One potential shortcoming of the Ghost Console is that it does not integrate into other vendors' management software.

While Drive Image Pro does not have a comparable enterprise management feature, it does ship with several useful administration tools. These include:

- DeltaNow, which distributes

No cloning around

For serious enterprise disk duplication, Norton Ghost edges out Drive Image Pro.

BY DOUGLAS SPINDLER

changes to software applications after an image has been distributed.

- Drive Mapper, which lets you correct drive letter inconsistencies during image restorations, and
- MagicMover, which lets you move applications from one partition to another.

Our tests showed that these utilities work well.

Norton Ghost has a feature similar to DeltaNow, but it lacks the functionality of the other two programs.

Getting started

For our first test, we measured the time it took to go from shrink-wrap to creating an image file on a test workstation. We did not

want to make registry changes, modify existing programs or add software to our NT workstations.

Both products are shipped on CD-ROMs that automatically load. We did not want to add CD-ROM driver support on our boot disk, so we copied the program files to a boot diskette. With both products, this process was cumbersome. It took 20 minutes to install each product and start creating an image file. Once we got the products up and running, it took Drive Image Pro 51 minutes to create an image of our 3G-byte hard drive. Norton Ghost required 53 minutes to create that same image.

Both products have a DOS-based graphical user interface, support a mouse and offer menus that were intuitive enough so that we did not have to refer to either product's documentation. We found Ghost's interface easier to navigate without a mouse, but both were comparable

when using a mouse.

Norton Ghost and Drive Image Pro status screens provide detailed statistical information during the cloning process. Both products imposed the DOS eight-character limit for file names. After creating several image files, it was difficult to identify images using only eight characters. However, Drive Image Pro allows comments to be added that describe image files. This makes it very easy to select an image file to restore.

Once you have an image, you can begin to distribute it to other workstations. The most effective medium used to distribute images is the network. Both products also support a variety of ways to transfer images from one computer system to another — parallel port, Jaz and ZIP disk, Superdrive, tape drives, CD-RW and with a CD burner CD-RW — but all these methods are slow.

We found the best way to distribute an image for "mass deployment" is to use a method that Symantec calls Multicast and PowerQuest calls Powercast. With these features, you

Symantec

Norton Ghost 6.0



Symantec's Norton Ghost won our Blue Ribbon Award because it offers centralized management of desktop cloning services across an enterprise network.

can have one image file sent to hundreds of workstations at the same time while preserving network bandwidth. Both products require that you create a special client boot disk, which was an easy process. It should be noted that Powercast won't work over a token-ring network.

For quick-and-dirty single-PC cloning, you can connect two workstations on the network using a crossover cable and set up one workstation as the source and the other as the destination. We could clone as many as four systems simultaneously. As soon as we brought up a fifth machine, the cloning performance on all machines suffered significantly. Using Novell's LANalyzer we found that the Ethernet segment had become overloaded. We then tried the same five workstations using Multicast and Powercast and found we had bandwidth to spare.

We found that Drive Image Pro was slightly faster in restoring a 5G-byte hard drive — 30 minutes, vs. 32 minutes for Norton Ghost to do the same job. With that comparable performance, the difference in lapsed time is not a differentiating factor.

Each program has an easy-to-use scripting language that can automate the entire process. Additionally, each manufacturer has its own simple program to change the security ID on each cloned workstation. The security ID is a 64-digit value that is generated

NetResults

Norton Ghost 6.0



Symantec

(541) 334-6054

www.symantec.com/sabu/ghost/ghost_enterprise

\$1,230 for 100-client license

Pros

- ▲ Includes a management console that allows for remote administration of desktop cloning services.

Cons

- ▼ Eight-character file name limits the ability to identify image files.

Drive Image Pro 3.0

PowerQuest

(801) 226-6834

www.powerquest.com/driveimagepro

\$600 for 50-workstation license

Pros

- ▲ Provides easily identifiable image files.
- ▲ Includes a useful suite of supplemental programs.

Cons

- ▼ Installation is only supported on a FAT partition.
- ▼ PowerCast feature is not supported in token-ring environments.

using a complex formula during the installation of Windows NT.

The manual for each product was 175 pages in length, and each provided adequate information without being overly complex.

Both products did a commendable job creating new desktop images and restoring damaged ones. We feel that Norton Ghost is best-suited for a large enterprise environment with standardized hardware and software. On the

other hand, we felt that because of the flexibility Drive Image Pro offers, it may be the best choice for an environment that is not standardized across all desktops. Whatever system is used, disk cloning is by far the quickest and

most reliable way to roll out a new operating system and applications.

Spindler is a technology consultant in the San Francisco Bay area. He can be reached at spindler@dnai.com.

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How we did it

We tested these products by cloning and resizing hard drives, completing mass workstation deployments and re-imaging a single machine. We created a "standard build" for each workstation, including the operating system, software programs and custom settings. We used each product to create an image of the workstation's disk on a server and then distributed the image to several target workstations simultaneously. In another test, we added a second, larger drive to a test computer system and cloned the standard build from the smaller drive to the larger drive. In a third test, we assumed that the target workstation contained corrupted software, so we deleted the existing software and installed our standard software image on that machine.

Our Windows NT workstation was running Microsoft Office Professional 2000, Internet Explorer, Netscape Navigator, WRQ's Reflection, Lotus Notes Client, Adobe Acrobat Reader and Symantec Norton Antivirus.

Our test server consisted of an ASUS P2B350-U motherboard with 128M bytes of RAM and a 27G-byte Integrated Drive Electronics disk drive running NetWare 5. We used this server to store image files created from our cloned workstations.

The workstations were six Compaq DeskPro systems each with a 333-MHz processor, 32M bytes of RAM and a 3.2G-byte hard drive. All machines were networked via 3Com 3c905 PCI 10/100 network interface cards and a Pure Data 10/100 hub across a 100M-bit/sec network. We monitored network traffic with Novell's LANalyzer 2.2.



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Cool Tools

Quick takes on high-tech toys

Lee Schlesinger, Technology Editor

DNA DEFECTS WOUND PRODUCT

I had high hopes for Miramar Systems' Desktop DNA. This product promises to migrate files, applications, and desktop, network and

printer settings from one desktop client to another, letting you re-create your familiar environment on a newer, presumably faster PC.

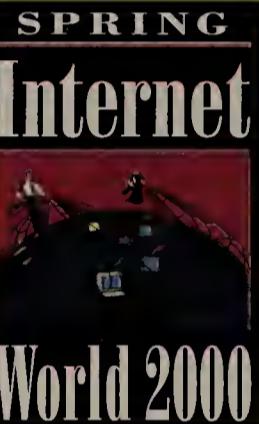
The program gets you about 80% there. But when you're talking about an administration automation tool, that's not far enough.

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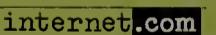
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One big problem is Desktop DNA's poor support for existing applications. The program requires scripts to move any application it finds on the source computer over to the destination. However, Miramar ships the product with only about 30 scripts. If you're simply running Microsoft Office, WordPerfect Office, Lotus Notes and Netscape Navigator, you're all set. Otherwise, you'll need to use a disk imaging program such as Norton Ghost or PowerQuest Drive Image (see review, page 63) in conjunction with the product to move all your other applications, and you'll have to customize each client individually.

Desktop DNA requires that both source and destination computers be connected to the network during a migration.

I tried moving the software and settings I'd installed over the course of two busy years on a 266-MHz lab machine onto a newer 450-MHz Pentium III. Desktop DNA found Word, Excel (but not FrontPage), Eudora Pro and Symantec pcAnywhere. It missed Adobe Acrobat Reader, Symantec Act! and dozens of other programs.

Miramar says it plans to make a script-writing tool kit available shortly, but none ships with Version 1.0 of the product.

Desktop DNA does a lot of things right. It requires you to enter a password at the source, and every destination PC needs to enter that password for access. Desktop DNA validates a migration before starting to let you see whether, for example, you already have the application on the target machine to which you're trying to migrate. It creates history and error logs, enabling you to see what occurred and roll back changes from any migration. You can save a set of migrated programs and settings as a profile to be sent to multiple destination machines.

The company is also responsive when it comes to product updates. I discovered a bug with bringing Eudora attachments to the new PC. Miramar developed, tested and distributed a new script that fixed the problem in less than a week.

Miramar is the first to market with this kind of application, but it won't be the last. I've already seen a demo of a competing product. For now, I'd hold off on any such product until the vendors prove they can do it right. □

Net Results

Desktop DNA

Miramar Systems
www.miramar.sys.com/products/ddna/index.htm

\$245 for 5-user license

Bottom line: Fine in concept but doesn't go far enough. Wait for Version 2.1.

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Management Strategies

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Making time

How to manage your schedule and maximize your productivity.

BY DENISE DUBIE

Time flies." "Who's got the time?" "Where does the time go?" These common sayings are heard all too frequently in today's busy culture. How can you ensure you are using your time to the fullest?

"Some people are natural at it, and others aren't," says Kathleen Greer, founder and president of Kathleen Greer Associates, a corporate counseling and training firm in Framingham, Mass. Three things to consider when juggling a lot of tasks: minimizing urgency ("Does this need immediate attention?"); meeting customer needs ("Who are you trying to keep happy?"); and getting the most done.

"People must also be well aware of their personality strengths and weaknesses," she says. "An honest self-assessment will go a long way toward getting control of the time in your life, professionally and personally." Once you understand more about your time management challenges, you can consciously plan your work.

Even with the advances in communication technology, such as voice mail, fax, e-mail and cellular phones, it seems there still isn't enough time in the day to get everything done. Some may argue that it is exactly those advances that have bogged down the average manager. Others would rally in favor of their high-tech tools, such as the Palm. Either way, most agree that without a plan of attack, you can drown when trying to manage multiple priorities.

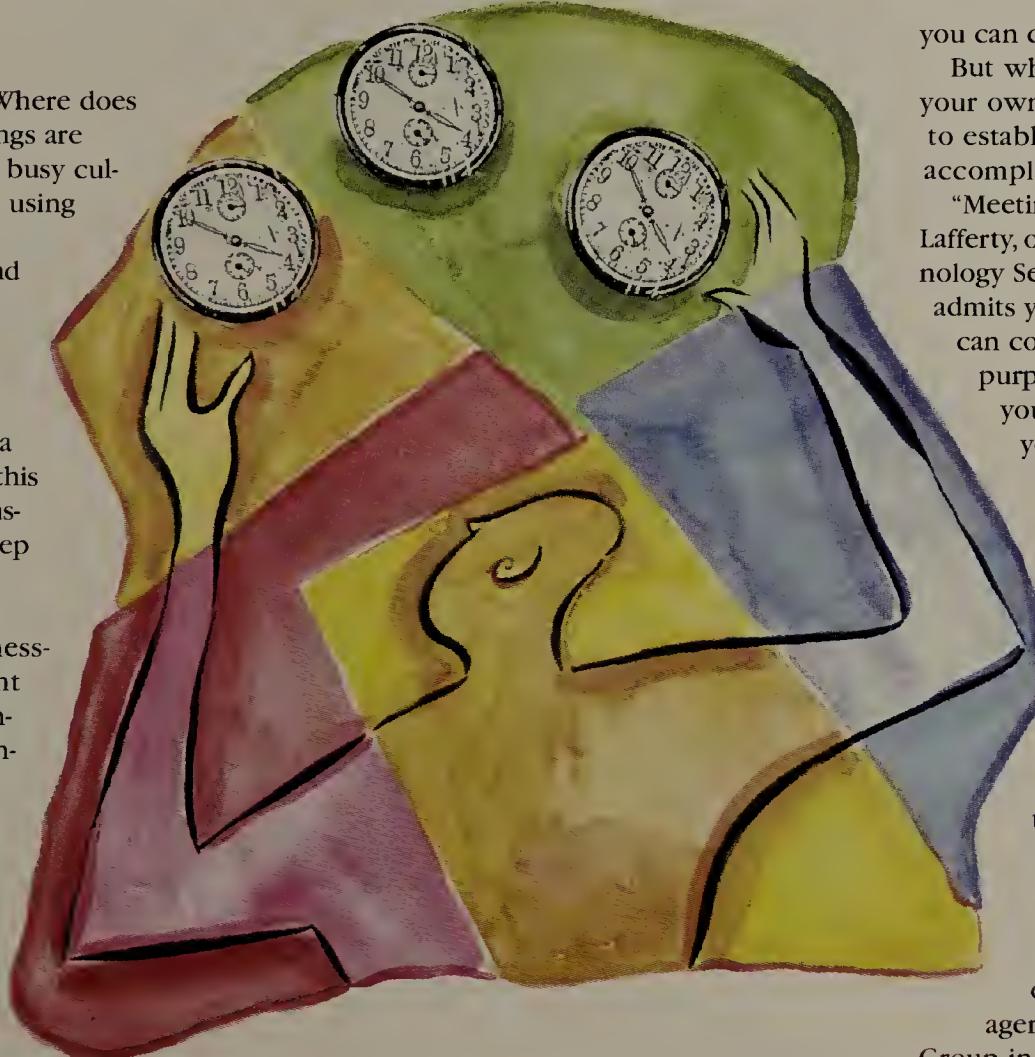
Tips from the trenches

When it comes to e-mail and voice mail, you must schedule time to sort through your inbox and separate the messages demanding immediate attention from those that can be handled later.

"Otherwise, they will rule your life and prevent you from getting your work done," says Dwight Gibbs, chief techie geek at The Motley Fool in Alexandria, Va.

George Yeager, manager of architecture and design for Columbia Energy Group Service's enterprise multimedia services in Columbus, Ohio, says it helps to leave a detailed greeting on your voice mail.

"I leave a meaningful message on my voice mail,



particularly when I am on special projects or trips," Yeager says. "This reduces the amount of voice mail I have to access by directing callers to someone who can help." He addresses his voice mail messages daily so he doesn't miss opportunities to keep customers happy.

Greer delegates tasks whenever possible by forwarding voice and e-mail messages to a more appropriate person. Gibbs concurs: "You can't do everything, so move as much off your plate as possible so

you can concentrate on the important stuff."

But what about when your time is not entirely your own? You have to meet with staff or managers to establish goals, and somehow nothing gets accomplished.

"Meetings — avoid them at all cost," says David Lafferty, owner and president of Scientific Technology Services in Anchorage, Alaska. Realistically, he admits you cannot always avoid a meeting, but you can conquer one. Lafferty suggests publishing the purpose and agenda of a meeting in advance if you are in charge and requesting an agenda if you're just a participant.

"If you make an agenda, then stick to it," he says. "But if you are not in charge, pipe up when it gets off the topic and say something like, 'Hey, aren't we getting off the topic?' It seems obvious, but it's not always."

After the meeting, don't forget to publish the minutes along with a list of action items. Note what needs to be done, who is going to do it and when it is to be done.

Time management tips can be used to address longer-term projects as well. Giving staff written objectives helps motivate employees and gets projects completed on time, says Jack Wolfin, business manager for Northwest Bi-products Management Group in Seattle.

"I like to see everyone in the organization have measurable objectives to be evaluated against," he says. "I have found people will work to achieve greater performance when a clear target has been established."

Columbia Energy Group's Yeager implemented a comprehensive Notes-based activity tracking system for his department. "Everything we do for a customer is tracked with updates reported to all activity stakeholders as they occur," he says. "The idea is to cut down on meetings and keep everyone informed with high efficiency and frequency."

Scientific Technology's Lafferty says publishing project goals helps minimize efforts later on. "If something does not directly support reaching those deliverables — drop it," he says. "But that is where your project managers should be earning their keep."

As a final thought, The Motley Fool's Gibbs suggests changing some personal habits. "Get up early or stay up late," he says. "You'd be amazed how much work you can get done between 4 a.m. and 7 a.m." □

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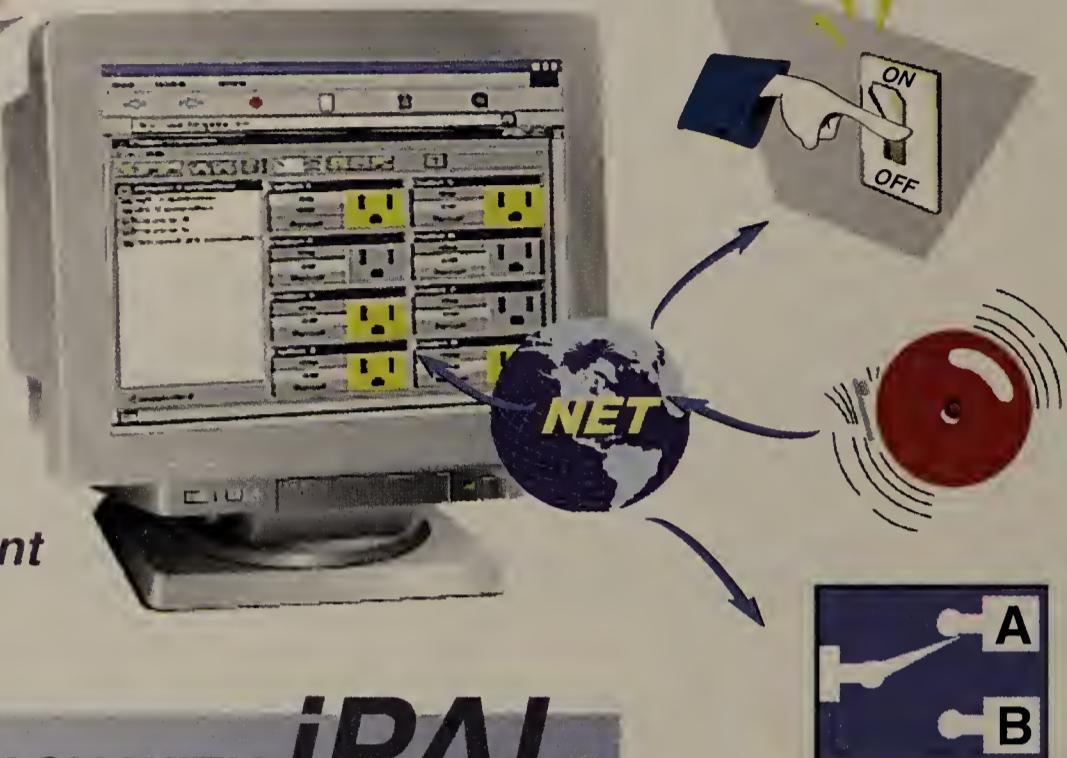
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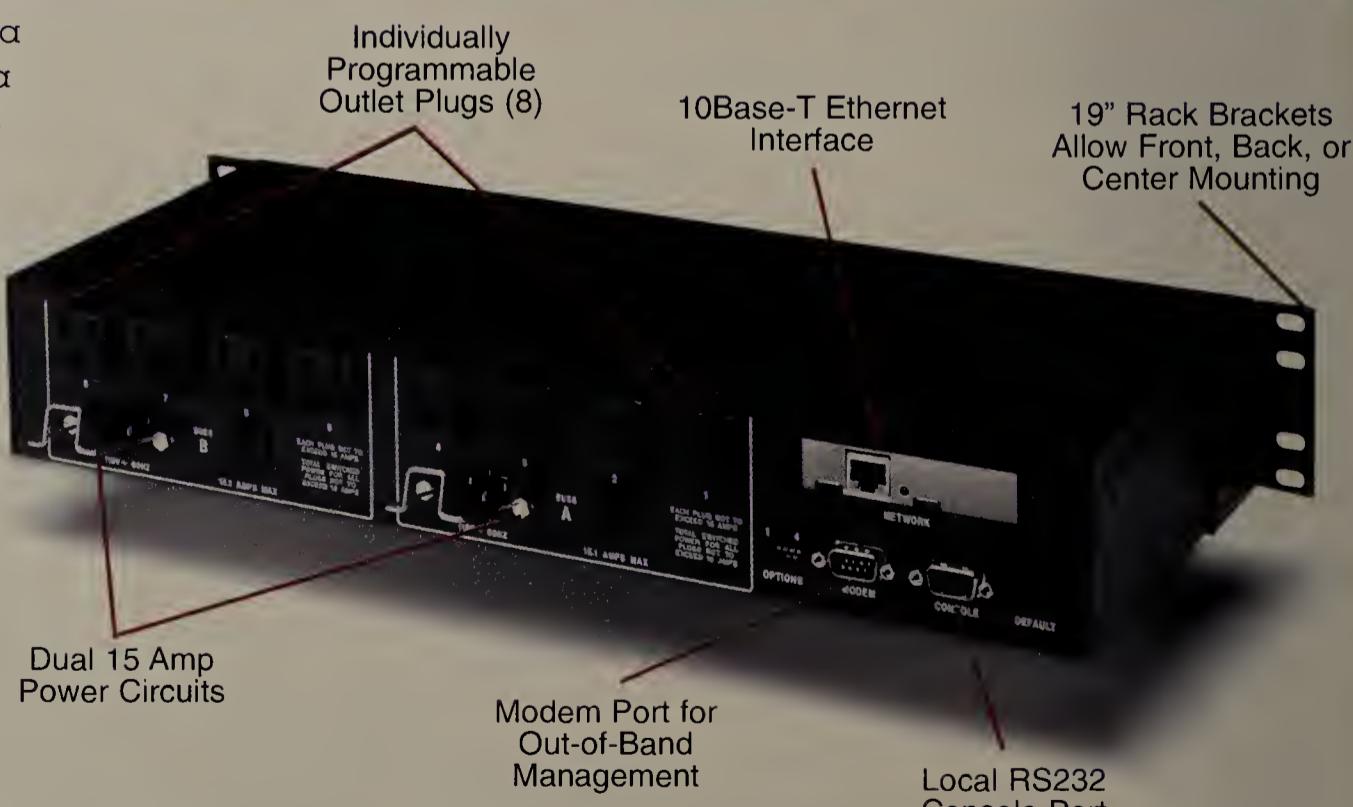


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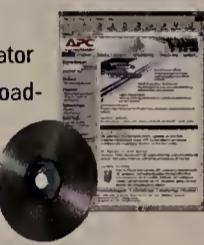
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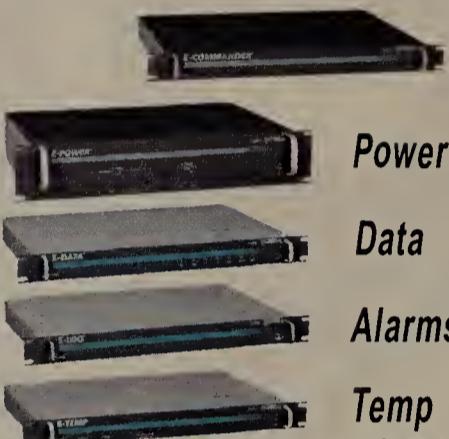
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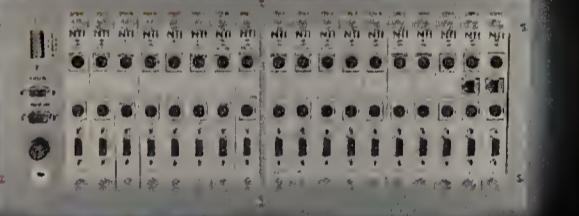
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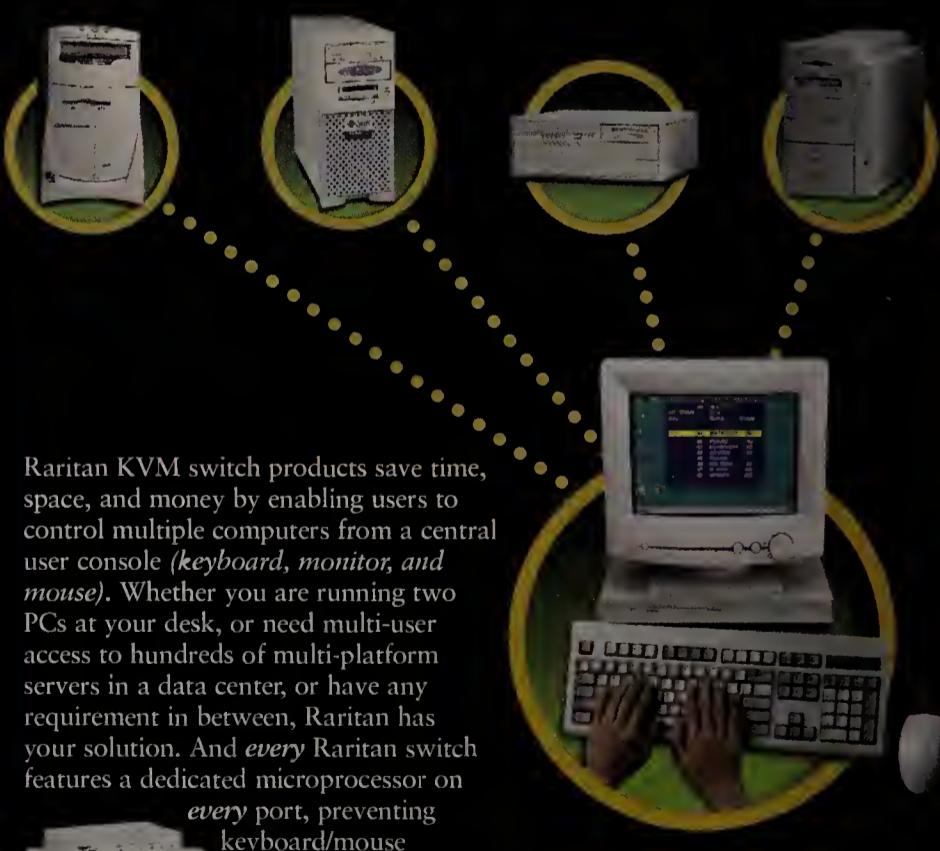
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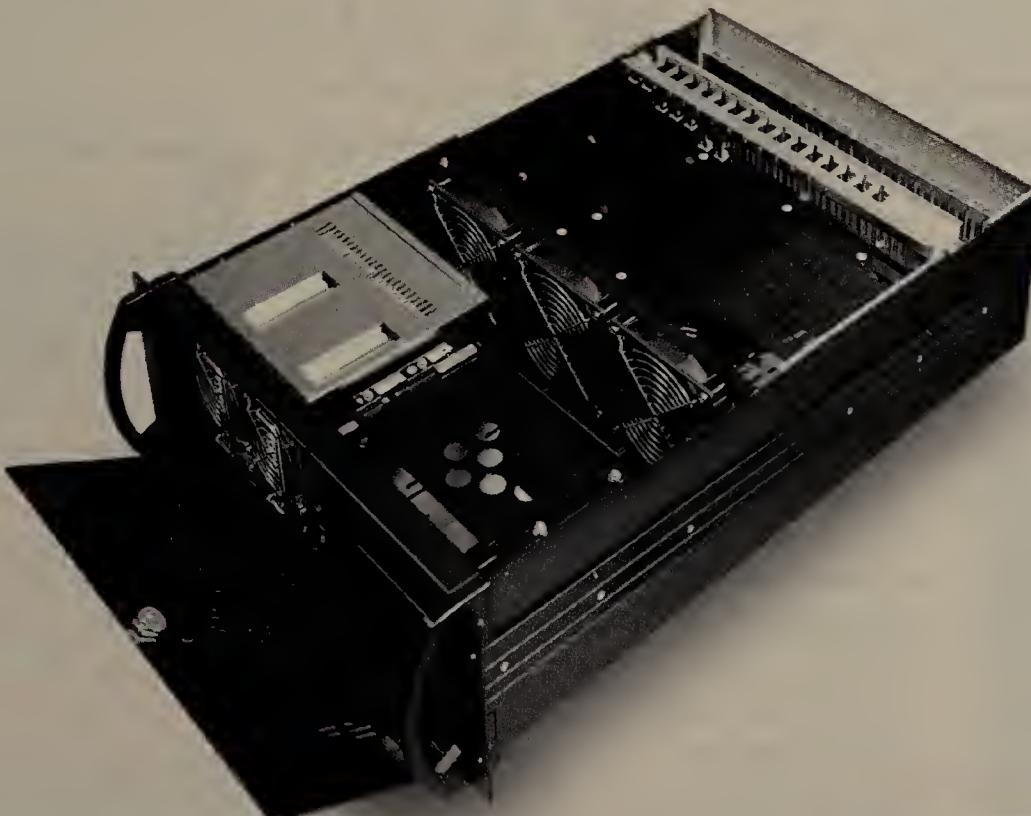
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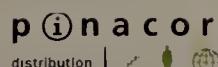
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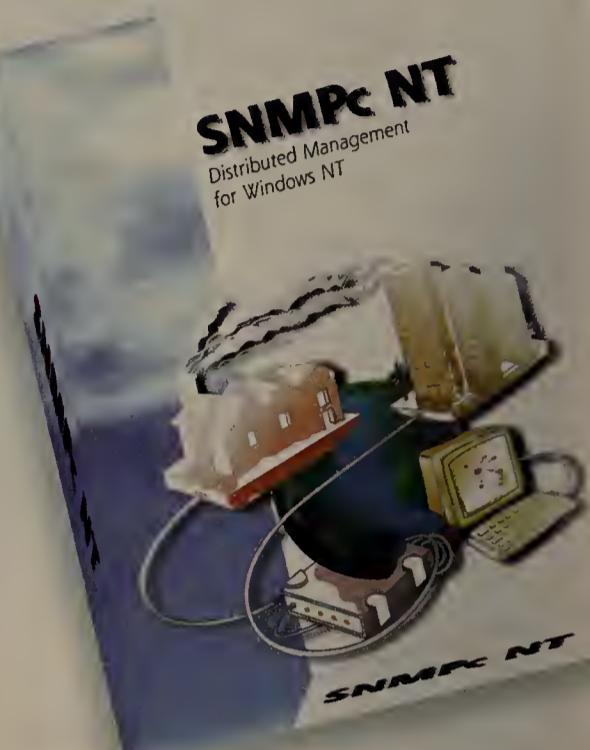
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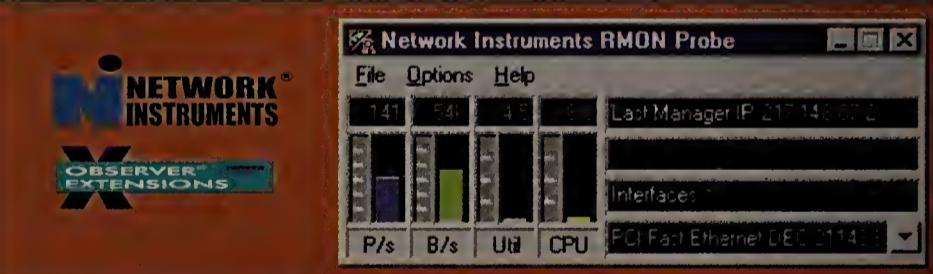
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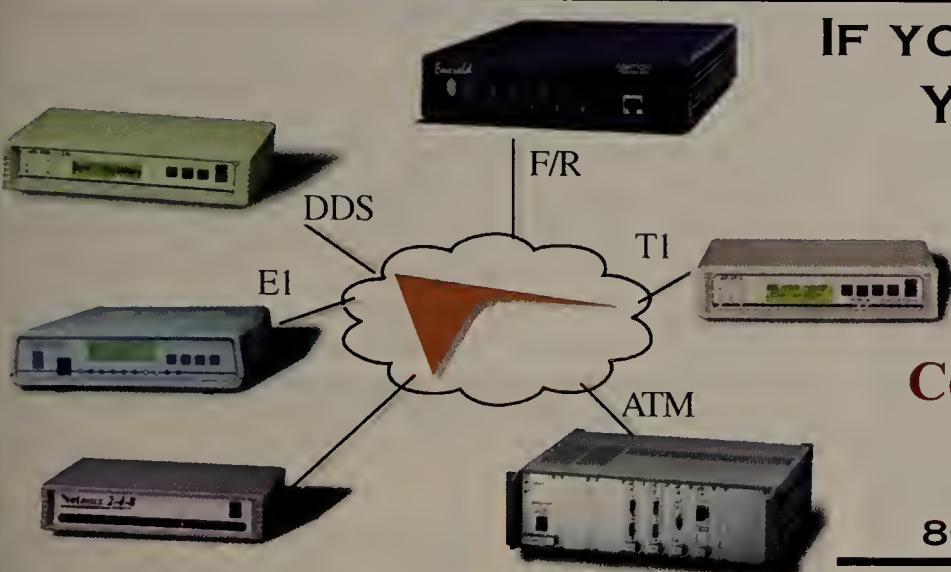
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Software Engineers (2 positions) to manage and generate software requirements, design, develop and test state of the art Integrated on demand services IP/ATM switch (supporting ISUP, ISDN, SGCP/MGCP, MF-R2 protocols and North American Numbering plan) providing ATM-TDM, TDM-ATM, TDM-TDM, TDM-IP, IP-TDM, IP-ATM, ATM-IP, ATM-ATM, IP-IP interconnections using Object Oriented Methodology and Structured Methodology in C, C++, and CORBA; design, develop and test call processing, SS7 (ISUP & MTP) and feature development (Call Forwarding, LNP, Call Waiting etc.) for Integrated on demand services (voice, multimedia etc.) over IP/ATM switch. M.S. (or foreign equiv.) in Comp Sci or any branch of Engineering with 3 yrs experience required. A B.S. (or foreign equiv.) in any of the above mentioned field with 5 yrs of relevant progressive experience will also be accepted. Salary \$60K - \$80K pa, 40 hrs/week. Send resumes to Softplace Technology, Inc., 1301 Deer Trail Road, Birmingham, AL 35226.

NetGuruSystems, the 2nd fastest growing Technology Company in the 1999 New England Fast-50, currently has multiple openings in each of the following programs:

Senior software Engineers - Lead a development team in design, development, testing of Internet, database applications using C/C++ or VB6, Java, Active Server Pages, or database administration of Informix, Sybase or Oracle; Require Master's or equivalent with 1 - 2 years experience.

Software Engineers - Design, develop Internet applications, database applications using InterDev, VB, HTML, JAVA, JDBC, JDK, JavaScript, SQL with backend (SQL Server or Oracle) or Database Administration (SQL Server, Oracle); Require Bachelor's or equivalent with 1 - 2 years experience.

QA Test Engineers - Perform automated or manual software testing and QA using any tool (Win Runner or QA Partner or SQA Robot); Require Bachelor's or equivalent with 1 - 2 years experience.

Technical Resource Managers - Actively manage the Marketing, Sales and Support of company's technical services and products; Require Master's degree or equivalent with strong technical IT background. Please Forward resume to Netguru systems, Attn: HR-LC-CW, 240 Bear Hill Rd., Ste 101, and Waltham, Ma 02451

Senior Solutions Engineers & Senior Software Engineers needed by Boston, MA Co. involved in the Dsgn & Dvlpmnt of state of the art speech recognition technology. Both positions require a Masters Degree in Computer Science or Engineering or related field together with industry experience in software development. Respond by resume to: HR Dept., SpeechWorks International, Inc. 695 Atlantic Ave. 2nd Flr, Boston, MA 02111.

Worldwide provider of SAP services is seeking to fill the position of Sr Consultant (SAP environment). Qualified applicant must have a Bachelor or equivalent in Computer Sc., Computer Eng., Mgmt or Business Admin. & 3 yrs. relevant exp. Applicant will provide SAP services to company clients utilizing SAP R/3 & database design to configure SAP software for customers' financial modules; design, implement & administer complex client-server solutions, including infrastructure, organizational structure, integration with existing information systems, & educating client employees, coordinate project management, implementation of company software & provide support solutions to business processes; initiate & coordinate key activities for achieving group success, & provide leadership for development of SAP products. Send resume to Managing Director, Magnus Management Consultants USA, Inc., 3340 Peachtree Rd., Suite 2310, Atlanta, GA 30326

SOFTWARE ENGINEER:
Experience in System Analysis and design in distributed database application; Demonstrated ability to work with Sybase & Replication server under Sun Solaris and HP UX; Proven ability in leading the team and in project management from system study to implementation of the system. The job duties are:

Analysis of current procedures and problems to refine and convert the data to programmable form; determine output requirements; study existing system to evaluate effectiveness; upgrade system presently in use; develop, test and implement new software; correct systems/programs as necessary. Requires Masters in Mathematics (or) Computers (or) Science with six months of experience in software development. 40 hours per week at \$ 75,000/- per year. Please send resumes to Case #19982981, PO Box # 8968, Boston, MA 02114.

SAP Consultant (multiple openings) to consult with client to define business need or problem relating to financial/accounting application; analyze business processes & document flow, & prepare functional specifications for same; design, develop & customize information structures using SAP (Systems, Applications & Products) module; perform data conversion from existing system to newly defined SAP system; assist in implementation of solutions; & report findings & recommendations to client; Reqs. Master's in Comp. Sci., Comp. Engg., Electronics Engg., Systems Analysis, Comp. Info. Systems, Mgmt. Info. Systems, Financial Info Systems, Bus. Admin., Management, Finance, Accounting, Statistics or Math or its foreign equiv equiv plus 1 yr exp in job offered or 1 yr related exp as Programmer, Programmer Analyst, Systems Analyst, Systems Analyst/SAP, Software Engr. or Consultant; \$56,500/yr, 40 hrs/wk, 8a-5p. Send resume or CV to The Phila. Job Bank, 444 N. 3rd St. - 3rd Flr., Phila, PA 19123, J.O. # 6029201

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PROGRAMMER ANALYST with 2 years of industry experience to design and develop software applications. Excellent communications and a Bachelor's degree required. Fax resume to: Tina (781)932-0895 or email: tbetti@raymondkarsan.com EOE M/F/V/D

Sr. Systems & Network Architect needed for NJ IT Co. to design system/network architecture for production systems & train/lead administrators/operators. Apply to: Global Consultants, 601 Jefferson Rd, Parsippany, NJ 07054.

Software Engineers design, specify and develop communications interface for embedded control building mgmnt s/w based on LonWorks. Requires 3 yrs exp develop embedded controller products for LonWorks network and micro-processor technologies using C/C++ and Neuron C, incl. 1 yr develop interface for industrial real-time automation and design distributed processing control systems; Apply to: Human Resources, Andover Controls Corp., 300 Brickstone Square, Andover, MA 01810. Fax 978-470-0946. Email: jobs@andovercontrols.com

Software Engineer wanted by Comp Services Firm in Chelmsford, MA. Must have Bach in Comp Sci & 3 yrs exp dvlpg financial applic s/w with Oracle, VB, C/C++. Respond to: HR Dept, General Applied Technologies, 121 Brick Kiln Rd, Chelmsford, MA 01824.

Consultant sought by Florida based Comp S/ware Service Provider for position in Boston, MA. Must have 2 yrs s/ware exp. Respond to: HR Dept, Canfield Outsourcing Inc., 2449 First St, Fort Myers, FL 33902.

Computer Support Consultant Litigation sought by Counselors at Law in Philadelphia, PA. Must have Bach or equiv in Comp Sci, Info Sys, Business Admin or related field & 3 yrs exp assisting on product dvlpt, dvlpg custom templates to facilitate specific kinds of litigation work with JFS Litigator's Notebook. Respond to: Jodi Cauvin, Morgan Lewis & Bockius LLP, 1701 Market St, Philadelphia, PA 19103-2921.

PROGRAMMER ANALYST sought by Computer Services Co in Holmdel, NJ. Must have Bach in Comp Sci, Comp Engg or Comp Info Sys & 1 yr exp planning, dvlpg, testing & documenting comp s/ware using C/C++ & Visual Basic in Win NT envrmts & dvlpt of Internet/Intranet applics using HTML. Respond to: HR Dept, Integrated Solutions, 2124 Highway 35, Holmdel, NJ 07733.

Database administrator wanted by Electronics Mfr in Secaucus, NJ. Must have Bach in MIS, Comp. Science, Elect Engg or Physics & 3 yrs exp. Respond to: MECA HR (DA), Panazip 3C-6, 1 Panasonic Way, Secaucus, NJ 07094.

Pharmaceuticals Mfg Co in Suffern, NY seeks to fill the following job openings:
i) Systems Analyst/Manager, Production Systems Development- Must have BS in Comp Sci & 5 yrs exp in systems analysis.
ii) Programmer/ Database Administrator-Must have BS in Info Systems & 2 yrs computer exp.

Respond to: BB, HR, Novartis Pharmaceutical Corporation, 25 Old Mill Rd, Suffern, NY 10901.

MBNA Hallmark Information Services, a subsidiary of a major national bank, is actively interviewing for a limited number of openings in its Distributed Operations department in Newark, Delaware. **LEAD DATABASE ENGINEER** I * Must have a bachelor's degree in a quantitative discipline and five years of experience as a database engineer or in a related field. Must have experience with UNIX and Windows NT. Competitive salary and benefits package offered. Send resume including current salary to RTC, 600 Route 25A, East Setauket, NY 11733, Attn: HFTZ

ORACLE/SOFTWARE ANALYST: Design, develop & implement business software applications using Oracle tools and UNIX. Registration of applications using Application Object Library. Bachelor's in Computer Science, Electronics Engineering or related field. 1 yr. exp. specializing in Oracle. Please send (or fax) resume to: Stephane Wynter, Hearst Distribution Group, Inc., 250 West 55th St, NY, NY 10019, fax 212-765-7807.

Edgesys, Inc reqs Computer Professionals. Positions available req MS (or equiv) & 1 yr exp for Software Engr & BS (or equiv) & 2 yrs exp for Programmer Analyst.
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Excellent Benefits Apply to: Attn: Recruiter 352 7th Ave, Ste 1215, NY, NY 10001

Systems Analyst/SAP (multiple openings) to analyze business & document posting requirements; prepare functional specifications for the business processes; customize/modify the SAP (Systems, Applications & Products) system; & provide user training of SAP software; Reqs. Bachelor's in Comp. Sci., Systems Analysis, Comp. Info. Systems, Mgmt. Info. Systems, Systems Mgmt., Bus. Admin., Management, Mech. Engg., Industrial Engg., Manuf. Engg., Comp. Engg., Electrical or Electronic Engg., Statistics or Math or its foreign educ equiv; \$56,500/yr, 40 hrs/wk, 8a-5p. Send resume or CV to The Phila. Job Bank, 444 N. 3rd St. - 3rd Fl., Phila, PA 19123, J.O. # 5029187

Programmer Analyst (multiple openings) to analyze, design, develop & document computer applications using Oracle Manufacturing v10.6, Designer 2000, Developer 2000, Forms 4.5, Pro*C, PL/SQL & SQL*PLUS with Oracle 7.x & 8.0 & operating system HP UNIX running on HP 9000; Reqs. Bachelor's in Comp. Sci., Systems Analysis, Comp. Info. Systems, Computer Engg., Comp. Sci. & Engg., Electrical or Electronic Engg. or Mathematics or its foreign educ equiv; \$56,500/yr, 40 hrs/wk, 8a-5p. Send resume or CV to The Phila. Job Bank, 444 N. 3rd St. - 3rd Fl., Phila, PA 19123, J.O. # 7058464

SOFTWARE ENGINEER, TRADING SYSTEMS
Investment Management firm seeks a Software Engineer for trading systems to provide 24/7 hardware and software support for the computer system utilized by the company's commodity/ currency trading desk. Duties also include developing software interfaces linking the trading desk with research and accounting groups, writing and customizing software programs for the trading desk and supporting/ maintaining existing trade programs. Master's degree in Computer Science required. 1 yr exp in job/duties or 2 yrs. exp as Software Engineer designing/ implementing performance monitoring systems & developing user interfaces. Salary according to experience. Send resume including current salary to RTC, 600 Route 25A, East Setauket, NY 11733, Attn: HFTZ

Programmer/Analysts wanted by investment banking company in Greenwich, CT. Must have a Bachelor's in Computer Science or Electrical Engineering and 2 years experience analyzing, designing, developing, coding, testing, implementing, enhancing and maintaining real-time financial systems used to analyze, price and trade domestic and international securities, utilizing distributed object oriented programming, Windows NT, Unix/C, C++ and a relational database management system. Respond to: Dave MacWilliams, Greenwich Capital Markets, Inc. 600 Steamboat Road, Greenwich, CT 06830.

DB Administrator needed for Informix relational DB admin & prgmg, shell script prgmg & web applic dvlpt. Apply to: R. Gorga, Bluestone Consulting, 1000 Briggs Rd, Mt. Laurel, NJ 08054.

Software Engineer (2 openings): Design, develop and implement computer software systems using PeopleSoft and related software. Work requires extensive travel and frequent relocation. Must have 1 year of experience as Software Engineer or as a computer professional as well as 1 year of experience using PeopleSoft and related software. Bachelor's degree in Computer Science/Applications, Engineering, Math, Physics, Chemistry or business related field. Salary is \$85,000.00 per year, 9am - 5 pm. Send resumes, referencing Job Order 1029373, to Mr. Terry Kinney, Manager, Armstrong County Job Center, 1270 N. Water Street, P.O. Box 759, Kittanning, PA 16201.

Applications Programmer
Design and develop ActiveX components, including ActiveX controls, EXEis and DLLs, for Visual Basic 5.0 and 6.0 applications. Object Oriented implementation. Must have at least an MS degree in Computer Science or CIS or related degree, and 6 mos. of exp. in above position or 6 mos. exp. as Software Developer or related position w/ability to use: Object Oriented Analysis Tools, Visual Basic 5.0, Access and DB2 Database, and Crystal Report. 40.0 hr/wk. \$54,000/Yr 9:00 AM -5:00 PM.

Applicants send resume to: Richard Conrad, Program Manager 300 Grimes Bridge Road Roswell, GA 30075

SOFTWARE ENGINEER:
Design and development of UNIX Scripts and Sybase Stored Procedures to load, analyze, aggregate and extract data from Corporate Data Warehouse onto the local DataMart. UNIX Scripts are written to automate and schedule the above-mentioned tasks. Must develop application tools utilizing UNIX, Shell Scripts, Sybase, GUIs in VisualBasic and Report Development using Crystal Reports. Requires: B.S. in Computer Science. Demonstrated ability in Client/Server development using UNIX, Sybase, C and Visual Basic. Must have at least five years experience in software development including one year experience in developing Data Warehouse technology. 40 hrs/wk (9 to 5); \$68,000/yr. Send two resumes/response to Case #19983023, Box 8968, Boston, MA 02114

SOFTWARE DEVELOPER: Writes test scripts and User Interfaces for a network test tool using TCL/TK. Develops networking software using C/C++ and application level GUI using MFC, Visual C++ in Windows 95 and NT. Develops device drivers using C and NDIS in Windows NT 4.0. Requires: M.S. in Computer Science or EE or a B.S. in Computer Science or EE with two years experience in a software development position. Must have knowledge as evidenced by course work or experience in C/C++ and GUI development as well as socket programming and TCP/IP. 40 hrs/wk (9 to 5); \$65,760/yr. Send two resumes/response to Case#19982916, Box 8968, Boston, MA 02114.

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SENIOR CONSULTANT: (Mt. Laurel, NJ) At least 2-4 years of experience in an AS/400 & System 21 products environment. The position also requires experience in design, testing and implementing technical functional solutions.

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Software Engineer to design, develop and test computer software for business applications, applying principles and techniques of computer science, engineering and mathematical analysis. Analyze software requirements for feasibility of design and hardware interface. Design and direct software system testing procedures. Implement, administer and upgrade Oracle Financials ERP Suite 10.7 and customize forms and reports using expertise in Developer 2000, PL/SQL, SQL*Forms and Oracle 7.X administration. Requirements: Masters Degree in computers, engineering or related field and three years experience in software engineering, computer programming or computer research, or a Bachelor's Degree and five years progressive experience. Knowledge of Oracle Financials ERP Suite 10.7, Developer 2000, PL/SQL, SQL*Forms and Oracle 7.X administration. Salary: \$90,000/yr. Working Conditions: 8:00 a.m. to 5:00 p.m., 40 hours/week. Apply: Mr. Clem Pizzutelli, Manager, Uniontown Job Center, 32 Iowa Street, Uniontown, PA 15401. Refer to Job Order Number 1029371.

System Analyst : Analyze user req, procedures and problems to automate processing to improve existing comp sys .Formulate/define sys scope and objective ,write detailed description of user needs ,program functions and steps req for developing and modifying comp programs. Design,dev and implement applns and sys as well as study existing info processing sys to evaluate effectiveness and develop new sys based on user needs. Duties entail working with Oracle,Designer 2000, Developer 2000,Oracle Web Appln server , PVCS, HTML,Java, PL/SQL Req: Bach Deg in Comp Sci, Math, Engineering or Tech + 2 yr exp on job and 2 yrs as Prog Analyst, Applns Programmer, Consultant, Applns developer or SW Eng. Spl Req: Exp must involve database-Oracle ,Languages -Java, PL/SQL & HTML Tools : Designer and Developer 2000 ,Oracle Web Appln Server Case Tools - PVCS. Sal \$70,000/yr, 40hr/wk 8.30a-5.00p. Submit resume to PA Job Center at The Phila Job Bank, 444 N 3rd St -3rd Fl, Phila PA 19123 indicating Job order #5029228.

Development Engineer: Work with cross-department project teams to analyze and develop requirements for electronic product solutions. Develop application program features and analyze existing software for performance and maintainability. Implement plans for the technical maintenance and enhancement of products after their initial launch. Work with the development staff, including Quality Assurance and Customer Support, to troubleshoot and fix bugs discovered during or after the development process. Must have BS or equiv in Comp Sci or related field and knowledge of RDBMS application tools including PL/SQL and Oracle as well as of RDBMS system development techniques. Respond to: H.R. Dept., Peterson's 202 Carnegie Center, Princeton, NJ 08543-2123. No calls.

CONFIGURATION MANAGEMENT INC. is seeking individuals with experience in any of the following skills:
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to research, design and develop next generation DSP/Modem products using Matlab and C++ under Unix and Windows NT environments to simulate performance of complex detection schemes involving adaptive equalization, Viterbi channel decoding, and frame synchronization; Develop, test and fine-tune optimized ADSL modem signal processing algorithms on fixed-point DSP processor using DSP assembly language and timing critical parts implemented using ASIC which involves VHDL design, MTI VHDL simulation and Synopsis VHDL design compilation. Require: M.S. degree in Computer Science, an Engineering discipline, or a closely related field with two years of experience in the job offered or in research, design and development of data communications applications such as modems and wireless communications. Extensive travel on assignments to various client sites within the U.S. is required. Salary: \$87,000 per year, 9 am to 6 pm, M-F. Send resume to: Branko Terkovich, Director, Engineering Services, Engineering Resource Group, Inc., Powder Mill Plaza, 101 Gibraltar Drive, Morris Plains, NJ 07950. Attn: Job BW.

Senior Software Engineer: Design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation. Work requires extensive travel and frequent relocation. Must have one year of experience in job offered or as a computer professional as well as one year of experience using BaaN. Masters degree in Computer Science/Applications, Engineering, Chemistry, Math, Physics or a business related field. Will accept Bachelor's degree with five years of progressive experience as computer professional. Salary is \$105,000 per/yr, 40 hrs/wk., 9:00-5:00 p.m. Please submit resumes to: Mr. Tom Dembosky, Manager, Indiana Job Center, 350 N. Fourth Street, Indiana, PA 15701. Reference Job Order No. 1029378.

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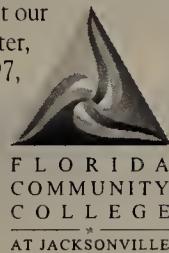
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PHOENIX, AZ

MONDAY, FEBRUARY 28
Mesa Community & Conference Center

ST. LOUIS, MO

MONDAY, MARCH 13
St. Louis Airport Marriott

TYSONS CORNER, VA

MONDAY, JANUARY 17
McLean Hilton Hotel

PHILADELPHIA, PA

TUESDAY, FEBRUARY 8
Adam's Mark Hotel

DETROIT, MI

TUESDAY, MARCH 7
Hyatt Regency Dearborn

DALLAS, TX

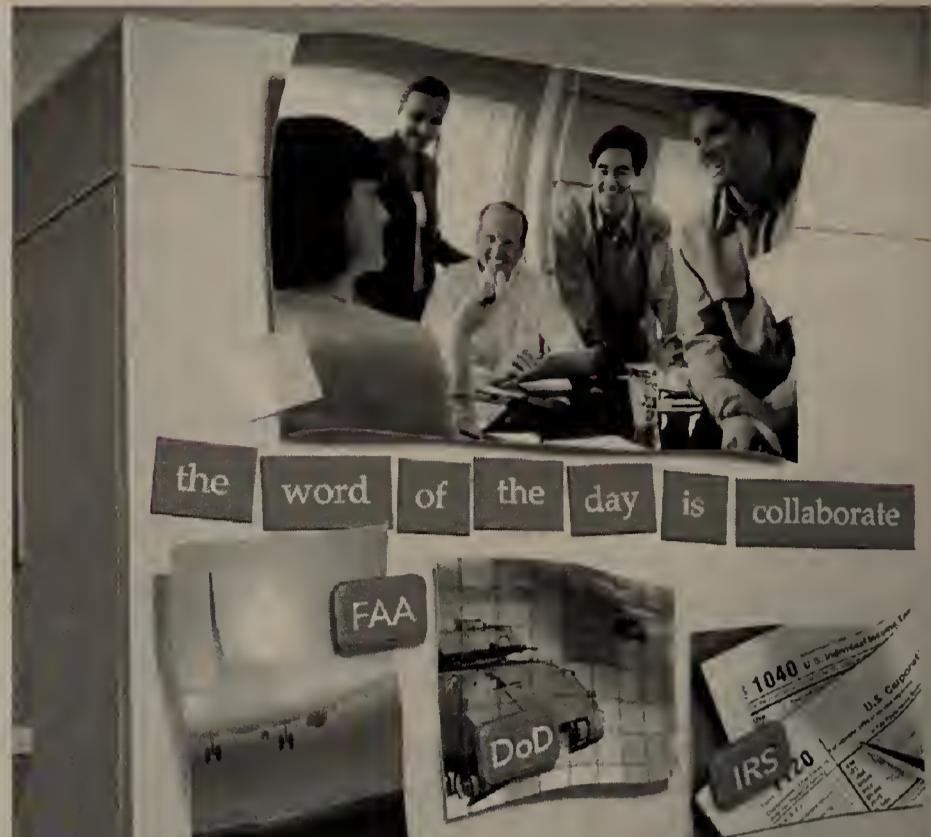
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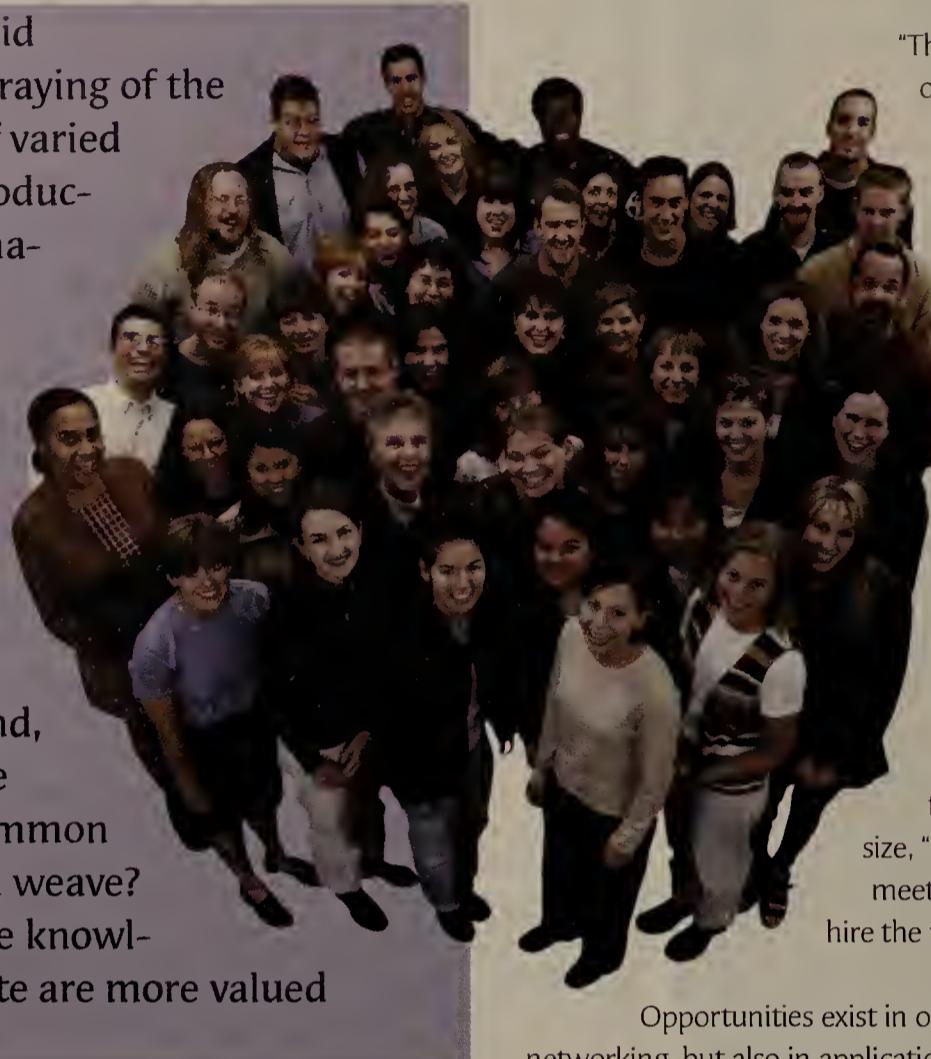
COMPUTERWORLD

DIVERSITY in IT CAREERS

by Carole Hadden

While many long-standing, staid professions struggle with the graying of the experts and blending people of varied backgrounds and ideas into productive teams, the world of information technology is different.

In the IT world, diversity is the dominate thread in meaningful innovation for customers. The workforce is relatively young, where experts are as likely to be in their 20s as in their 40s. Education, background, ethnicity, ideas — all are diverse among IT professionals. The common threads in this rich professional weave? An international mindset where knowledge, ideas and ability to execute are more valued than anything else.



Aetna Hartford, CT

Aetna has long been known in the insurance world, but in the past decade the company has emerged as an information technology powerhouse. Today more than 3,000 IT professionals work at Aetna, where diversity efforts focus on inclusion to achieve innovation.

Carole Pincavage, head of corporate applications, says Aetna, long-known for creating a sense of community amongst its employees, has aggressively sought to heighten employee awareness that diversity of people and ideas plays an essential part of building a thriving employee community and in achieving business success.

This is especially true for Aetna's IT organization. Like most companies today, technology is the central platform for business innovations. For an IT organization to develop and implement these innovations, new ideas, different perspectives and experiences are necessary. Pincavage points out that Aetna's IT organization fosters the exchange of ideas and the welcoming of diversity in a number of ways, at both its leadership and grass root employee levels.

Senior leadership sponsors diversity forums both within and outside the company, has overhauled its project management assignment process to include team diversity and has funded college internships focused on diversity students. But the real strength of Aetna's IT efforts comes from employee-led groups. Aetna has had employee networks for African-Americans, Hispanic, Vietnamese and gay and lesbian employees since 1995. These networks sponsor events that couple diversity awareness and involvement with Aetna's sense of employee community.

The IT group has gone a step further and created an IT Diversity Forum to focus on IT-specific opportunities. The Diversity Forum spearheads initiatives such as special cultural events and IT-focused speaker sessions, and takes the lead in community outreach.

"The reward of these diversity efforts is a stronger organization, more representative of the communities where we do business and the increase in the number of ideas we are able to implement on behalf of our customers," says Pincavage. She notes that as the foremost healthcare company and a premier financial organization, "we often develop technology enhancements that become industry standards, such as our Intelihealth website and our trademarked Doc Find that enables Aetna US Healthcare members to select network physicians online. "Without the knowledge our own diverse employees provide, we would have less insight into the needs of our 20 million healthcare members," she says.

Maura Kearney, human resources team leader for Aetna IT, points out that because of Aetna's IT size, "we are able to hire opportunistically. When we meet a strong candidate, we often have the capacity to hire the person and find challenging work."

Opportunities exist in operational areas, such as computer centers and in networking, but also in application development where IT experts work closely with Aetna's business units to develop technological answers to business specifications. Kearney says the work undertaken at Aetna frequently becomes the national standard from a technical perspective and from a business stance. "Our Doc Find is a good example," says Kearney. "If one of our 20 million members need to find a doctor, we have an electronic database that provides that directory in one source. It's the industry standard."

Pincavage says the diverse pool of IT employees at Aetna receives a wealth of learning opportunities, internally as well as through outside education and conferences. "There's also a tremendous amount of ability to move around internally, to take on new positions and to gain all different kinds of experiences," she adds.

"Aetna is as diverse as the community where we live," says Kearney. "We have a welcoming group that works hard, is committed to the business but that also celebrates uniqueness and accomplishment."

There are opportunities with Aetna offices throughout the country. However, the key technology centers are located in Hartford, CT, Bluebell, PA, and Jacksonville, FL.

Microsoft Corporation Redmond, WA

LaVonne Dorsey, the diversity recruiting strategy specialist at Microsoft, has a mission in life. She moves in a circle of professional organizations that reflect the diversity of society—from the National Society of Black Engineers to the Society of Hispanic Professional Engineers to Women in Technology International. Through them, she gauges how highly talented potential employees respond to the company, and whether the company is succeeding in attracting the best and the brightest.

"We initially do a phone screen. We seek people who will succeed so our interview process focuses on things you have done and accomplished in your

DIVERSITY in IT CAREERS

career in technology. We want information that shows how you adapt, take leadership, and accomplish great things," says Dorsey.

"We've found that what may be thought of as extreme in traditional business – appearance or culture – really doesn't matter at Microsoft," says Dorsey. "It's about your skills and helping your team move forward."

Microsoft is a place where you control your own destiny. You lead your own career. And we support that independence." Independence is reflected in Microsoft's approach to continuous learning, too. The company offers a self-motivated and self-directed learning program that incorporates online, classroom, one-on-one and external resources.

"This is not a corporation that believes anyone needs to be taken care of," stresses Dorsey. "We focus on skills not time in grade. We have a lot of lateral movement and complete change of careers. Again, you can go for what you need or want."

The MITRE Corporation McLean, VA & Bedford, MA

While dot-coms and industry push and shove through competition in the IT world, The MITRE Corporation is a stand-alone. This government-sponsored firm provides top level systems architecture and information systems support to government agencies. It's an environment rich in intellectual appeal, while implementation and execution are at the heart of the operation.

Bill Albright, director of Work Quality of Life, says MITRE works primarily with the Internal Revenue Service, the Department of Transportation (FAA) and the Department of Defense. "We operate in the public interest as a not-for-profit," says Albright. "Our role is to assure that, in our areas of expertise, the government's money is being spent on getting solutions to very important problems.

"That same philosophy spills over into how we manage people – we are public-interest oriented and want our organization to look like the country's population," Albright says. "With the changing demographics occurring in society, we clearly are on a mission to make certain we cultivate a work environment to make us as attractive as possible to a future workforce that will be heavily dominated by women and people of color."



"It's about your skills and helping your team move forward."

customer base — the US Air Force, other Department of Defense entities, the Defense Information Systems Agency, the IRS and others. "We do hire new college graduates, but the majority of folks have the experience that allows MITRE to offer government agencies the sound judgement needed to shape technical decisions," Albright notes.

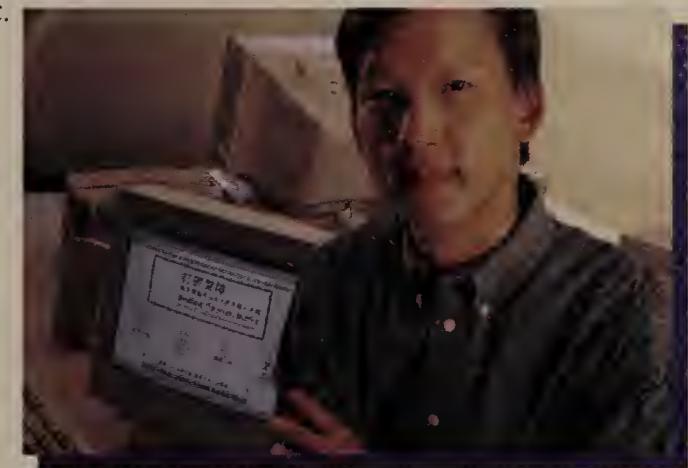
"This is a collegial work environment where people grow through their collaboration on important projects," Albright says. "We supplement this learning with The MITRE Institute, which sponsors technology program training, and management, leadership and diversity training. The institute assists us in staying on the cutting edge, but we also offer tuition reimbursement."

MITRE's two primary sites are in McLean and Bedford with approximately 60 sites located worldwide.

Network Appliance, Inc. Sunnyvale, CA

At the foundation of the data explosion is the ability to store information in a meaningful way. That's the basis of work undertaken by NetApp — Network Appliance, Inc.

"Essentially, we've made adding storage as easy as plugging in a new appliance," says Chris Carlton, NetApp's vice president of human resources. "It plugs in and it works, adding tremendous amounts of storage in a Windows or UNIX environment."



NetApp faces doubling its workforce and its revenues every year, as it has done for the past four. "We've encouraged diversity from the start," says Carlton, who points out that the company grew from 70 employees five years ago to more than 1,200 at the end of 1999. This number will double again by year-end 2000. "We talk about diversity not just in terms of appearance but in thinking and ideas. We must value these if we want to continuously change, double in size and work with the variety of mindsets of our customers."

Doubling in size every year means employees basically work for a different company every year. "What's demanded, what's required, the technology used — all that changes every year with this kind of growth," Carlton says. "We introduce new products every quarter, and we're moving out of rented space into buildings going up next to our new headquarters — adding almost a million square feet to manage our ongoing future growth."

To maintain the growth edge, NetApp offers learning on the job through a collaborative organizational style, as well as through a number of external organizations. "You'll be working with the best and brightest here, so you'll learn from the people with whom you work. We supplement this with development courses and the constant expansion of new jobs. You're limited only by your own desire to try something completely new."

NetApp looks for people with experience in a wide range of technologies, Windows NT, Unix, storage, networking, file technology and who have implementation skills. In addition to the headquarters in Silicon Valley, NetApp has a remote development site in North Carolina.



MITRE is a company of computer scientists and electrical engineers working in the web, networking, signal processing, software engineering, systems engineering, architecture and development environments. The company organizes around its

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EDS, Ariba join forces on e-commerce network

BY ELLEN MESSMER

PLANO, TEXAS — Electronic Data Systems (EDS) last week formed a subsidiary that will manage a private Web-based network designed to help groups of companies use their combined purchasing power to buy a variety of goods.

The EDS CoNext subsidiary, formed in conjunction with business-to-business e-commerce vendor Ariba and consultancy A.T. Kearney, will attempt to automate a business practice called "strategic sourcing." This practice



Ariba CEO
Keith Krach
says dozens of
groups will use
CoNext's net.

involves buying goods based on pricing terms shared by a group of companies, and is done today mainly through fax and phone by corporations on good terms.

Pioneer effort

EDS CEO Dick Brown calls CoNext a first-of-its-kind effort, noting that EDS has a billion-dollar war chest on hand to fund e-commerce projects. However, he declined to say how much the company will invest in the Leveraged Sourcing Network, as CoNext's net is called.

EDS has tapped Ariba to provide the network's under-

lying Web-based procurement technology. Ariba markets software for purchasing goods from desktop computers and operates the Ariba Network, a set of mailbox and gateway services to connect buyers and sellers over the Internet.

Ariba expects to see about a dozen consortia created in the future for conducting business-to-business purchasing over CoNext's network, says Keith Krach, chairman and CEO of Ariba. The groups will be formed according to geographic location or other factors. Participating companies will band together to buy everything from office supplies to utility services

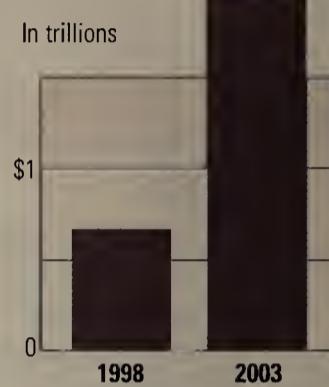
A.T. Kearney, which has

made a specialty of strategic sourcing consulting, will help EDS bring corporations onto the CoNext network, expected to be available in June. Initial participants include The Clorox Company, Entergy Services, Fort James, Kellogg, Prudential Life Insurance and Tyco Healthcare Group.

While it's unclear how much companies might save using CoNext-based purchasing, it will certainly cost them a lot to participate. It will require a "minimum of hundreds of thousands of dollars per year" just to join, says Dave Rome, Ariba's vice president of alliances. In addition, companies will have to pay transaction fees on purchases. □

Business-to-business to soar on the Web

According to The Boston Consulting Group, B2B e-commerce transactions will skyrocket over the next several years.



SOURCE: BOSTON CONSULTING GROUP

Cisco,
continued from page 1

switches with pricing and simplicity that Cisco hopes will appeal to companies with 250 to 1,000 employees.

While Cisco declined to comment on the announcements, sources say the firm will offer the new switches at about \$100 per Layer 2 10/100/1000M bit/sec port. In doing so, Cisco is looking to remain competitive with 3Com, which offers 24-port stackable 10/100/1000M bit/sec Layer 2 switches for about \$80 per port (NW, Sept. 13, 1999, page 21).

"These Cisco products hit the right price points, and they have just enough features to satisfy these types of customers," says Esmeralda Silva, research analyst at International Data Corp. in Framingham, Mass. "Everyone has been talking about how Cisco has taken on 3Com in the SME [small and midsize enterprise] market and is surprised at the amount of revenue that is generated from the SME group within Cisco."

"One thing to keep in mind is that Cisco is really targeting the 250-to-1,000 midrange customer base and not the 250 and below," Silva says. "Below 250, I don't think Cisco has hit 3Com significantly, but the 250-to-1,000 base is where Cisco has hit hardest."

The new Mid-Market products are the Catalyst 3548 XL, the 2948G L3 and the 4908G L3. The 3548 XL is a stackable 10/100M bit/sec Ethernet wiring closet switch, and the other two boxes are Layer 3 network core switches.

The 3548 XL is the new high end of Cisco's 3500 XL line of stackable switches. These switches use a two-port Gigabit Interface Converter (GBIC) for daisy chaining and point-to-point connectivity.

GBICs allow users to swap physical Gigabit Ethernet interfaces.

Cisco's new switch pitch

Catalyst 3548 XL

- 48 10/100 ports, two GBIC uplinks
- Stackable nine-high via GigaStack
- Up to 16 can be grouped under a single IP address via Cisco Switch Clustering technology

Catalyst 2948G L3

- Layer 3 version of 2948G for midsized backbones
- 48 10/100 ports and two GBIC uplinks
- Designed for aggregating multiprotocol traffic

Catalyst 4908G L3

- Layer 3 Gigabit Ethernet backbone switch
- Eight GBIC ports

The 3548 XL also supports Cisco Switch Clustering technology for grouping distributed switches into a single cluster or IP domain. Cisco Switch Clustering allows users to group and manage up to 16 switches with a single IP address.

The 3548 XL features 48 10/100 ports and two GigaStack GBICs. Up to now, the 3500 XL line topped out with the 24-port 3524 XL.

Business Resource Group (BRG), an office products chain on the West Coast, is testing the 3548 XL.

"Forty-eight ports makes good sense for us," says Walter Miller, manager of technology and infrastructure at BRG's San Jose facility. "We have a couple of suites connected over fiber with 30 to 50 users in each. We can buy a single switch for each suite instead of stacking multiples."

The 3548 XLs are part of a six-switch 3500 XL cluster that BRG can manage through a single IP address, Miller says. With the new 3548 XL, more than 750 ports can be managed through a single IP address, he says.

The previous limit was 384 ports with the 3524 XL. Before Cisco Switch Clustering, each switch had to be individually managed.

The 2948G L3 is a Layer 3 version of Cisco's 2948G, a 48-port 10/100 switch with two

Gigabit Ethernet uplinks. While the 2948G is a Layer 2 device designed for desktop and workgroup wiring closets, the 2948G L3 is a routing switch targeted at midmarket Fast Ethernet backbones.

Indeed, the 2948G L3 is intended for aggregating multiprotocol traffic from multiple wiring closets or desktop switches such as the Layer 2 2900 XLs.

For Layer 3 gigabit backbones, the 4908G L3 is positioned as an aggregator of Catalyst 3500 XLs and 2900 XLs in wiring closets. The device features eight GBIC

Lucent,
continued from page 12

each VPN Gateway or VPN Router. The Lucent IPsec client now supports a fully dynamic Internet key exchange and public key infrastructure to support and manage digital certificates. Digital certificates are used to verify users and networks for an added level of security.

Lucent is also rolling out its VPN Gateway 80, which is a network device that sits behind a router. The VPN Gateway 80 can support up to 400 IPsec tunnels simultaneously and costs \$2,000 to \$4,000. Lucent's VPN Gateway 201 is for larger enterprises supporting up to 2000 IPsec

Gigabit Ethernet ports.

Cisco also offers the 12-port Catalyst 4912G for users who need to aggregate gigabit wiring closet and server farm links. But this switch is a Layer 2 device, while the 4908G L3 is a Layer 3 switch, meaning users can further segment networks into subnets or domains and gain more control over where traffic flows.

The switches are expected to ship this quarter. □

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tunnels. It costs \$8,000 to \$12,000.

For customers who want an integrated router-VPN device, Lucent offers its Pipeline, SuperPipeline and Access-Point VPN routers, which range in price from \$1,000 to \$45,000, depending on the WAN port configurations. Lucent's VPN Routers are not new but are now formally integrated into Lucent's Secure VPN package.

"Lucent has probably assembled the most comprehensive line of VPN products," Hindin says. "To date, only Nortel has invested in both network and [customer premise equipment] sides of the VPN house."

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Extreme Networks builds next-generation wire-speed networks that create vast new business opportunities for ISPs, web content providers and enterprise customers around the world. Extreme combines the Internet protocol and gigabit switching with scalable bandwidth and end-to-end quality of service to deliver more information faster, while allowing businesses to accommodate growth and changes.



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Marconi plc (LONDON: MNI) is one of the world's fastest growing communications and IT companies with a strong record of innovation and technological breakthroughs. It is a world leader in smart broadband optical networks and it supplies the key technologies for the New Public Network and the Internet.

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MIL 3's Decision Support Software for Networks and Applications empowers IT professionals to manage the future of their e-infrastructures with cost-effective network designs and optimized IT services. Using hyper-realistic simulations, the software provides forward-looking performance analyses of proposed IT implementations to ensure sustainable delivery of committed service levels.

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Lightspeed is for today's e-business enterprise. With key business systems becoming increasingly reliant on the Internet, companies are facing new performance and availability issues. Lightspeed Systems offers a selection of powerful network traffic management tools that streamline the systems you have now, as well as those you will add in the future.

ComNet,
continued from page 1

help network professionals bolster all aspects of their enterprise IP networks.

For starters, Integral Access will introduce its PurePacket access switches. This gear employs Multi-protocol Label Switching (MPLS) to support voice over IP and DSL, as well as traditional voice and data. Corporate customers should be interested in Integral Access products because such switches can support network services that dish up different qualities of service (QoS) to meet the needs of different applications.

Integral Access says its switch can support QoS requests across pure MPLS-enabled IP networks, starting at a customer site where its Outburst SB access device supports multiple services over a single connection. For example, the device can simultaneously deliver 24 IP voice calls plus a 500K bit/sec data chan-

nel on a 1.5M bit/sec T-1 line. The gear also supports multiple traffic types over DSL lines.

Speaking of DSL, Larscom, which makes enterprise WAN gear, will debut in the DSL arena, wheeling out two offerings: the CupreDSU, a symmetric DSL modem, and the CupreBoss, a high-bit-rate DSL2 (HDSL2) modem.

The Larscom modems will address the corporate need for symmetrical links between sites and the desire for less-expensive connections. HDSL2 supports a service virtually identical to a T-1, but uses only two wires instead of four.

The devices support WAN services inexpensive enough that smaller corporate sites can be tied into enterprises by dedicated lines.

TollBridge, maker of voice-over-DSL gateways to public phone networks, plans to introduce its element management system that will let users more easily configure TollBridge hardware and troubleshoot service problems. The package

can speed the often slow process of getting DSL once customers order it and make it easier to resolve problems when something goes wrong.

Similarly, Vina Technologies plans to announce voice-over-DSL technology designed to make deploying such services easier. Voice over DSL can put 10 or more voice channels on a single traditional phone line with room left over for a wideband data pipe.

And expect voice-over-DSL announcements from Efficient Networks, following its \$1 billion purchase of Cabletron subsidiary FlowPoint, which makes DSL routers for customer sites.

For the IP world, industry giant Alcatel, a major force in Europe, plans the U.S. launch of its voice-over-IP platform for enterprise nets. The company would not release details about

the platform, but typically voice-over-IP products let corporations consolidate their local voice and data networks,



Celebrate net excellence at ComNet

Network World will present its 1999 User Excellence Awards at ComNet on Wednesday, Jan. 26, at 8:45 a.m., prior to the keynote address by Novell CEO Eric Schmidt. Attendees are invited to learn how our 1999 winners used network technology to cut costs, improve communications and enhance productivity.

Management,
continued from page 1

are helping expand Compuware's reach in networks.

Concord Communications, which owns the biggest share of the network reporting software market, will demonstrate eHealth, software that will include a global view of data in the company's network, applications, services and systems management products.

A third company making noise is Lightspeed Systems, a small 15-year-old company that is set to deliver a package of network traffic management tools for Windows NT.

These developments reflect a turn away from specialized management products, says Dennis Drogseth, director of Enterprise Management Associates. "There is a trend toward uniting management software into more intelligent clusters," he says.

Management platforms that incorporate many different functions have been around for a long time. But in recent years, IT managers have sought smaller-scale products that specialize in one function. Now the pendulum seems to be swinging back to multifunction software.

Compuware says it will use data from its EcoScope monitoring software to continuously update the network models generated by CACI's software. In the past, network managers would load network data into



Concord CEO Jack Blaeser says the company will be integrating its management tools over the next several quarters.

the CACI software and use the models to determine what problems might crop up. With the upcoming integration, when the models indicate that congestion problems may be imminent, the software will generate an alert.

"If Compuware can swing it, it would definitely be worthwhile" trying out the combined software, says Joe

Wrzosek, network analyst at 3M, which already uses CACI software. But he remains skeptical about how accurate the predictions would be.

Compuware will rename CACI's Application Profiler and Application Predictor; the new names have not been announced. The work is expected to be completed in the first quarter of next year.

Separately, Concord this week will announce its plans for eHealth, which will unite four categories of management tools under one framework. Concord acquired some of the tools last year along with Empire Technologies.

There are four components of eHealth. Application Health consists mainly of Empire SystemEdge software, and it notifies network managers of application failures. Service Health couples SystemEdge and software licensed from FirstSense to measure response times experienced by users. System Health is also based on SystemEdge, and it examines CPU and memory utilization on servers to check for potential problems. The last component, Network Health, is Concord's reporting tool for showing network performance over time.

"These components do go

and reduce their need for leased WAN links because one packet-based link can carry all traffic.

In a related area, a start-up service provider called VPX will introduce a VPN service. Located in Redwood City, Calif., the company will encrypt IP sessions over the Internet for its customers who

together today, but it's not as pretty as we would like it to be," says Jack Blaeser, CEO of Concord. "We'll be looking to integrate those four solutions into one seamless solution over the next several quarters."

Over the next year, Concord will look to integrate real-time monitoring and event correlation capabilities into its product set as well.

Lightspeed will announce a set of products for e-business applications based on NT. The products include Traffic Control for e-business, QoS Control for e-business, Server Control for e-business and Desktop Control.

Traffic Control performs several functions for managing traffic going to an NT server farm. The abilities include load balancing among the servers, providing security via a firewall and collecting traffic statistics. QoS Control can prioritize different packets, based on policies. Server Control monitors applications on the servers themselves, and can automatically restart the applications or reboot the server if problems occur. Pricing was not available. □

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www.nwfusion.com

don't want to build their own VPN networks.

VPN vendor Altiga will make its VPN concentrators more attractive by slashing prices. The boxes also get new nomenclature. The C10 becomes the C15 and drops from \$10,000 to \$8,000. The C50 becomes the C60 and drops from \$50,000 to \$30,000. The C20 becomes the C30 and drops from \$20,000 to \$17,500. The C30 also gets a boost in processing power so it can encrypt at 50M bit/sec rather than 25M bit/sec. The new device supports 1,500 simultaneous remote users rather than the C20's 1,250.

Upgrades of traditional gear

Paradyne will announce a scaled-down version of its smart DSU/CSU that measures the performance of frame relay virtual circuits. The new devices will make it affordable for customers to put circuit-monitoring equipment at each site in frame relay networks.

FrameSaver Flex DSU/CSUs not only cost less, but they also are easier to install than earlier FrameSaver gear, says Frank Weiner, Paradyne vice president of broadband access services.

The Flex equipment can be polled by FrameSaver's management platform to troubleshoot circuits. Software pre-loaded in the devices can be activated to generate data that can be used to verify whether carriers meet service-level promises.

Paradyne will also introduce an ATM card for its Grand Slam DSL multiplexer. The card will enable carriers to offer four different QoSes over a single symmetric DSL circuit. That means voice can be treated differently from data on the same wires.

Adtran will introduce an integrated access device for customer sites that combines voice and data onto T-1 lines. Combining traffic cuts the need for separate voice and data trunks, saving users money.

The Atlas 550 can function as a frame relay concentrator, a traditional T-1 multiplexer or a voice switch. It has LAN ports to allow PBX calls, LAN data and remote access traffic to share a single WAN link. □

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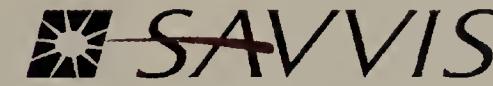
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Bloomberg

continued from page 1

In overhauling its network, Bloomberg spent "far in excess of \$50 million" on network equipment and personnel, says Tom Secunda, a Bloomberg founder and the company's head of development. But Bloomberg is already reaping the rewards of the project in terms of cost savings from not having to build its own network gear and from the ability to offer new Internet-based services, he says.

"The greatest advantage to us with the new network is that we can take advantage of new products and technologies," Secunda says. "We're able to buy someone else's hardware, although we tend to build a lot of the software ourselves."

By using IP, Bloomberg can make its information service interoperate with existing Internet content and can take advantage of Internet applications such as Real Network's RealAudio and Microsoft's NetShow to create multimedia news feeds.

"Bloomberg is now, in a loose sense, a portal," Secunda explains. "We provide our customers with Internet content, and we direct them to the appropriate content on the Web. For example, if you were looking at IBM information on Bloomberg, we can add a URL

that you can click on to get to IBM's Web site."

Founded in 1982 and headquartered in New York, Bloomberg provides breaking news and stock ticker information to banks and other financial institutions. Bloomberg has two

data centers to points of presence (POP) in major cities and then to customer sites. The POPs house routers for passing data. From the POPs, the information goes to routers at the customer sites and then to individual terminals.

of the special NEC SOCKS 5 server include Dresdner Bank and Merrill Lynch.

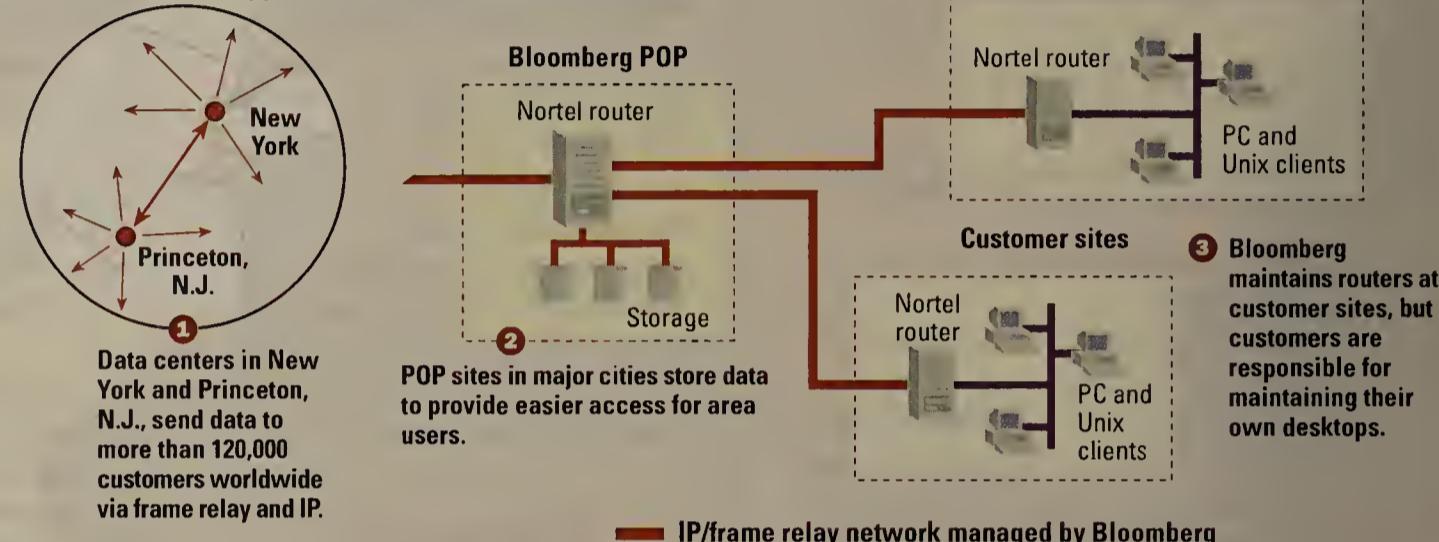
Dresdner Bank has migrated all 600 of its Bloomberg terminals — located in Frankfurt, Germany, New York, London, Tokyo, Hong Kong and

have hundreds of different concepts," Secunda says.

Bloomberg is already offering improved services for mobile users. In the past, customers could access information services on a portable computer via a dial-up connection. To sup-

Bloomberg goes the IP route

Bloomberg has replaced its proprietary network and terminals with an IP network anchored by Nortel Networks routers, and supporting Unix and Windows clients.



IP/frame relay network managed by Bloomberg

data centers — in New York and Princeton, N.J. — that are connected via a private frame relay network to tens of thousands of customer sites around the world. Bloomberg supports more than 120,000 terminals, which are usually owned and maintained by the customer.

Bloomberg relies on a handful of carriers to lease the portion of the network from its

In the past, Bloomberg used custom-made Intel multibus terminals that communicated with Unix servers — and before that, minicomputers in the data centers.

"We created a protocol that talked over our frame relay network. It ran on a proprietary box, built on Intel technology by us, to do screen display and protocol conversion at the customer site." Similar special-purpose boxes that supported the proprietary protocols were located in Bloomberg's data centers and POP sites.

The new network, which most Bloomberg customers had converted to by October, still relies on frame relay for the transport layer, but it supports traffic using both the IP and User Datagram Protocol (UDP) standards. Bloomberg uses off-the-shelf routers from Nortel Networks and commercial network management software such as Hewlett-Packard's OpenView.

During the network migration, Bloomberg customers ran into some problems sending UDP-based multimedia traffic through commercial firewalls. To resolve these problems, Bloomberg chose the SOCKS 5 protocol. In fact, NEC Systems announced in November a special version of its SOCKS 5 server — the EBorder Special Edition — that is customized for Bloomberg's services. Users

Singapore — to the new IP router system. At each site, Dresdner has set up a firewall complex based on NEC's SOCKS 5 server to protect Dresdner's corporate network from third-party networks such as Bloomberg's, says Norbert Schaar, network and security consultant for Dresdner Bank's Global IT Services. Schaar says NEC's special server "ensures the enforcement of our security policy, provides proxy services for a lot of services and applications, and enhances the security and availability."

With its IP network in place, Bloomberg plans to roll out new offerings in such areas as streaming audio and video as well as conference calling. "We

port such services, Bloomberg had massive phone banks in New York and other major financial centers around the world. Maintaining those phone banks was expensive. Now the same services are provided over the Internet at a reduced cost to Bloomberg, Secunda says.

By linking to existing Web content, Bloomberg can put its internal resources into developing new services. "We had a way of looking up ZIP codes and looking up plane schedules. Now we're deciding whether our systems are better, or if we should just link to the Web," Secunda says. "We have more options because we have the ability to transport Web content to our customers." □

Microsoft,

continued from page 14

Some observers say Gates stepping aside and reports of stalled settlement talks signal that Microsoft feels a breakup is a real possibility.

"If the company is broken up, I don't think Gates wants to be there for it," said Rob Enderle, a Giga Information Group analyst. Gates has maintained a breakup would be stifling and Ballmer concurs.

"It would be the single greatest disservice that anybody could do to consumers in this country. It would be reckless beyond belief," Ballmer said.

Ballmer said Microsoft's new vision could not survive a breakup. And the company's moves reinforce Microsoft's repeated assertions during the trial that the rapidly changing technology industry forces companies to innovate and change to remain competitive.

Microsoft has used AOL as

an example of that, and AOL's bid for Time Warner likely helped reinforce the point.

"Microsoft has to become a different company to compete in this market," says Dwight Davis, an analyst with Summit Strategies in Kirkland, Wash.

Davis says Microsoft must change in three areas — technology, licensing and its channel partnerships.

All of these changes represent challenges for Microsoft and will now fall squarely on Ballmer's shoulders.

"Four or five years from now, we may well peg this as the famous Microsoft transition that made them a much different company than they are today," Davis says. □



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ComNet is a trade event. No one under 18 will be admitted.

Squashing Rush and nets

There's some news that might cheer you: Rush Limbaugh has been sucked into a time warp.

Before you get too excited, I must fess up and admit that it is only the corpulent one's words that have been abused. Yep, thanks to the wonders of modern signal processing technology, radio stations can now optimize — in real time — the spoken word. Ideally, the objective should be to quell some of the more rabid pronouncements of Mr. Limbaugh but, alas, the goal is to get more airtime for advertising.

The system that is responsible for this auditory slight of hand is called "Cash" (cute, huh?) and is offered by Prime Image of San Jose, for a mere

\$12,000. What this box o' tricks does is squeeze audio in real time by reducing the duration of silences and other "modifiable" sounds, such as overly long syllables produced by certain speakers (an attribute of the entire spoken output of Mr. Limbaugh, might I venture).

There's no doubt that the device is very clever. It buffers the audio for a few seconds and then starts to replay it but dynamically prunes out the sonic deadwood as it does so. Consequently, the buffer gets shorter and shorter until you are potentially back to broadcasting in real time. And because the transformation intelligently removes time and doesn't involve compression, speakers don't sound clipped or like they are related to the Chipmunks.

So what do you do with the time you save? You stick an ad in it. Prime Image claims that you can gain as much as 60 seconds in every ten minutes (actually, www.primeimageinc.com claims "ten" minutes, which gives you an idea of how unsophisticated their Web site is).



MARK
GIBBS

That equates to six minutes per hour, or two hours and 24 minutes per day, or 876 hours per annum. In real terms, what this equates to is thousands of dollars every year in extra revenue.

Damn clever. According to the Jan. 6 issue of *The New York Times*, Rush Limbaugh didn't know that he was being — so to speak — Cashed, until listeners (should that be lemmings?) wrote in to ask why there were more ads in his shows. While Rush has some misgivings about the idea, he is quoted as saying "... of course, to the technology nerds, this is a fascinating device."

As Mr. Limbaugh gets a slice of the advertising revenue, I bet we can count him as being fascinated, which therefore implies he is a technology nerd. Right.

Anyway, this got me thinking: What if you applied the same ideas to IT and networking? Accordingly, the Gibbs Institute is proud to announce a new product: *Lucre*.

Lucre is a suite of cutting-edge tools that will help regain your lost bandwidth. On client PC, it scans word-processing documents as they are saved and removes all the excess stuff. For example, *gttng rd f unncsry vwls* is the first pass. Then *Lcr rmvs mltpl wht spcs n modfys crtн cmmn wrds ntllgntly*. For example, "and," which would otherwise be compressed as "nd," is reformatted as "n."

Next, *Lcr rmvs uncssry n rdndnt wrds n grmmcl cnstrcts*: This "give it to me" becomes "gv." Similarly, *Lcr grbs ntwrk pkcts whn thy ht th ntwrk n cmprsss idntcl bts 2 frthr rdce wstg*. Data is buffered in blocks rather than being sent in full.

The result? Clean, highly minimized network data transfers. Gibbs claims that this high-speed transfer is better than the current method of compressing data and then decompressing it at the destination. It's faster and more efficient.

Cmprssd cnmnts 2 nwcol umn@gibbs.com.



Talk to No Wonder CEO Anthony Lye

for even a few minutes about his budding online technical support company, and you'll come away with two questions: When is the IPO? And whose backside needs smooching to get my slice?

Here's a clue on the first question: sometime this year. As for the second? Start begging your broker.

This week, a \$40 million mezzanine round of venture capital starts shining down upon the Sunnyvale, Calif., start-up, a company that will top off an earlier \$25 million stake. Investors include **Integral Capital Partners, Menlo Ventures** and **Redpoint Ventures**, the recently merged byproduct of **Brentwood Venture Capital** and **Institutional Venture Partners (IVP)**. New to that lineup — and new to No Wonder's board of directors — is **Pierre Omidyar**, founder and chairman of eBay.

Now that's support.

Of course, all the capital on the planet won't keep fleas off a mutt of a business plan.

Such is not the case here, however. All this dough is being wagered on a sensible — you might say inevitable — solution to a pip of a problem: hellish tech support, be it from your friendly neighborhood software giant, a private contractor or your employer's alleged "help desk." If getting prompt, effective, fairly priced technical support from these established sources was a reasonable expectation, No Wonder would have no business opportunity.

The attention No Wonder has attracted to date stems from the company's enlistment of thousands of "volunteers" who have been providing tech support free of charge to some half-million registered users via e-mail and message boards. Starting this week, a revamped Web site — www.nowonder.com — will begin letting these parties interact live through online communication and remote desktop sharing. Next month, money will start changing hands and Lye's company will start taking a piece of the action through fees charged to the service providers that use the company's infrastructure.

A cornerstone of this e-commerce will be a "reverse auction" in which companies and freelancers who offer technical support services will bid for jobs posted by individuals and IT organizations.

"We expect that most of our revenue will come from business-to-business commerce that is generated on the site," Lye says.

The fact that money is about to start changing hands probably helps explain why so many of those "volunteers" have been so willing and able. Lye claims his support givers have been responding in less than an hour 70% of the time — "with most of that under 10 minutes" — and that they have been judged effective by more than 90% of users. And that's without the real-time technologies debuting this week.

So might No Wonder replace your corporate help desk?

"Replace is maybe a strong word," Lye says, sounding more polite than modest. "I think what IT organizations want to do is buy and sell services in a more flexible way than they do today."

My guess is that quite a few of you have already given No Wonder a try. I'd love to hear about those experiences.

You've got to feel sorry

for every parent who ordered Christmas presents from **Toysrus.com** expecting that the gifts would be delivered on time because the online retailer assured them such would be the case. Every parent, that is, except Kimberly Alguard of Snohomish County, Wash., who, as you may have read last week is suing the toy seller for ... for what? ... being a bad, bad Santa, I suppose.

Now I enjoy a frivolous lawsuit as much as the next fellow, but this one has me hoping there's a judge out in Seattle who's willing to toss Alguard and her lawyers directly into Puget Sound.

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